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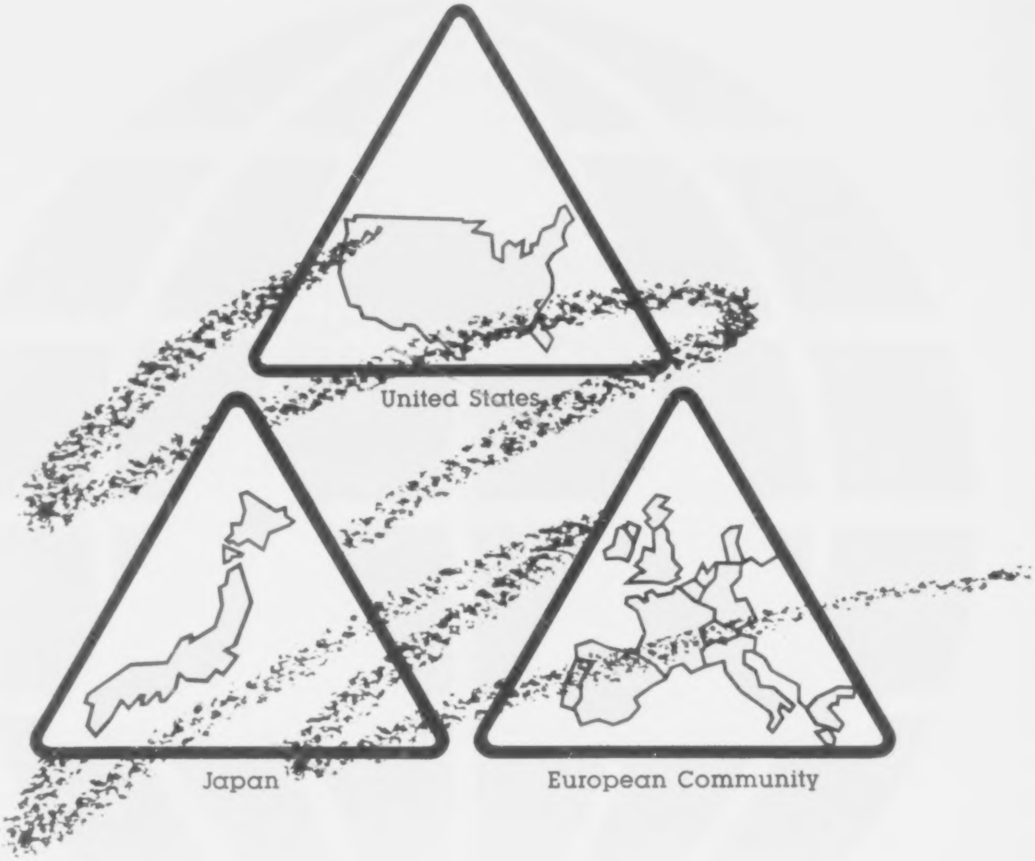
World Food Trade and U.S. Agriculture, 1960-1986

Trade Tensions Intensify


United States
Japan
European Community

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bstract

ld grain and oilseed production con-
ued to exceed utilization in 1986-87,
ding to a further increase in global
rryover stocks. Sharply reduced U.S.
ce support levels for major crops along
h large stocks pushed world grain prices
ell below the previous season. Lower
ices brought sharply increased govern-
ent farm program costs in the U.S. and
, and increased financial stress to farm-
s in other nations. Changing U.S. farm
licies, including lower price support lev-
s, a weaker U.S. dollar, and an aggressive
port enhancement program, generated
odestly increased U.S. shares of world
ain and oilseed exports.

Continued surplus world stocks of major commodities, low prices, and radically changed U.S. farm policies are important elements of the world food trade environment as GATT negotiations begin. Because of major financial pressures in world agriculture, GATT discussions will focus on ways of multilaterally reducing agricultural subsidies in major producing nations, as well as on ways of reducing barriers against agricultural imports. Other appropriate agricultural policies might deal with causes of slow growth in the world economy and agricultural trade, and enhancement of global food security.

Key Words: Grain, oilseeds, corn, soybeans, wheat, agricultural exports, global food, world agricultural trade, U.S. trade, trade policies, agricultural imports, Soviet grain imports, Chinese grain imports, world livestock production, EC enlargement, GATT.

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Foreword

The World Food Institute of Iowa State University is pleased to publish the seventh annual edition of *World Food Trade and U.S. Agriculture, 1960-1986*. As in previous editions, its purposes are: (1) to disseminate a comprehensive but understandable picture of the world food situation, the role of U.S. agricultural exports in world trade, and the impact of trade on U.S. agriculture; and (2) to identify emerging issues that will influence U.S. and world agricultural trade. It is intended to serve as a resource for scholars and citizens, producers and consumers, policymakers, and others who are concerned with alleviating the world's food problems.

In this edition, the authors note that although the world production of grains and related food and feed commodities set a new record in 1986-87, modest increases in utilization also occurred. As a result, the world stocks increased but at a smaller rate than in 1985-86. World grain exports increased slightly and the U.S. regained some of its previous shares of wheat and coarse grain exports, due to changes in its farm policies and aggressive use of export subsidies. The long-term outlook for the world economy is growth at a modest rate because of large public and private debts in both developing and developed countries. At the same time, world crop production seems likely to maintain its upward trend into the mid-1990s unless major weather problems occur over large areas of cropland. Strong competition for markets, therefore, seems likely to continue for several years.

Global stocks of grain are now equivalent to about 24 percent of annual utilization, but U.S. wheat and maize stocks, respectively, equal about 81 percent and 71 percent of total domestic utilization and exports. Food stocks are held largely by developed countries, while the number of hungry in developing countries continues to increase. The World Food Council reports that the number of hungry in the world grew by 40 million from 1980 to 1985, a rate considerably higher than that observed between 1970 and 1980, a period when the number increased by about 15 million (as reported in the World Food Council press release, 87/13/3, preceding its 13th session held from 8 to 11 June 1987 in Beijing, China).

Policies to correct existing inequities in world agriculture and trade are necessary in developing and developed countries. The authors suggest that the costs of subsidy programs are perhaps large enough to motivate the U.S. and EC to negotiate seriously at the next GATT (General Agreement of Tariff and Trade) meeting. Increasing economic interdependence among nations of the world will bring greater pressure to bear on agriculture and trade policies. In light of increasing hunger in the midst of plenty, policies to improve nutrition and health programs for vulnerable groups should also be considered. Access to food in the face of surplus supplies in the world's poorest nations seems to be as serious now as food scarcity was in the 1970s.

New subject areas included in this publication, in addition to the requirements for effective GATT negotiations, are livestock biotechnology, crop biotechnology and new uses for farm products.

This report addresses key questions important for U.S. and foreign policymakers, producers and agribusiness managers as they plan strategies for the near and intermediate future. It provides historical perspectives and background information on the interdependence of U.S. agriculture and the world economy. Your comments about this edition and suggestions for future editions of World Food Trade and U.S. Agriculture are solicited. Please send them to me or to Dr. Robert Wisner.

Charlotte E. Roderuck, Director
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Iowa State University
6/16/87

Summary and Implications

The world food situation in 1986-87 reflected a continued long-term upward trend in production; a slight increase in utilization of grain, oilseeds, poultry, and pork, and moderately increased global carryover stocks of grains, oilseeds, and vegetable oils. Despite the lowest harvested grain area since 1983-84 and the second lowest since 1974-75, world grain production set a new record in 1986-87 and exceeded global utilization by approximately 3 percent. This was the third consecutive year in which global production exceeded global utilization and the ninth year out of the last 12 in which production was greater than utilization. However, the gap between production and utilization narrowed in 1986-87, partly because of large-scale land-idling programs in the U.S. and adverse weather in parts of China and the Southern Hemisphere.

Moderately increased grain utilization, according to estimates by the U.S. Department of Agriculture, occurred in the U.S., USSR, and China with smaller increases in Eastern Europe, and several other developing nations. While world production continued to increase, its growth rate was slightly below the average of the last decade, reflecting increased U.S. land set-aside and long-term land conservation reserve programs as well as less favorable weather than in the previous year in parts of Europe, Argentina, and China. As has been the typical pattern in years of surplus supplies, much of the world's excess grain production continued to accumulate under various U.S. government storage programs, and U.S. carryover stocks are much larger relative to annual utilization than in other nations. At the global level, grain stocks are equivalent to approximately 24 percent of annual utilization, while U.S. wheat and corn (maize) stocks are equivalent to approximately 86 and 71 percent of total domestic utilization and exports.

World grain exports increased slightly in 1986-87 according to preliminary estimates, as a result of increased Chinese and developing country imports. Including 1986-87, world grain exports have increased 8 years out of the last 12. However, continued self-sufficiency of several previously large importers and sluggish economic growth held the 1986-87 export growth at about half the average growth rate of the 1970s. U.S. shares of world wheat and coarse grain exports increased modestly in 1986-87, reversing the downward trend of the previous 5 or 6 years. Increased U.S. exports were largely in response to dramatic changes in U.S. farm policies stemming from the 1985 Food Security Act, which sharply reduced U.S. price support levels and required aggressive use of export subsidies. Increased American wheat export shares reflected decreased trade shares obtained by the European Community (EC), Australia, and Argentina. The U.S. coarse grain export share also increased modestly, after declining for the previous 6 years. Coarse grain export shares of EC, China, South Africa, Argentina, Australia, and Thailand decreased. Total Western European and Chinese shares of world soybean meal trade declined slightly, while the U.S. soybean meal and soybean shares increased slightly in 1986-87, according to preliminary estimates.

Early indications point to a possible slight decline in global grain production in 1987-88, with relatively low world prices generating a modest expansion in utilization and exports. However, since 1986-87 production exceeded utilization by 3 percent or approximately 40 million metric tons, even the combination of slightly reduced production and increased utilization is not expected to bring a sharp reduction in global stocks in 1987-88. Early indicators point to a moderate decrease in grain production in the U.S. because of substantially increased government incentives to remove land from production, and in USSR because of less favorable weather.

Longer-term economic indicators, including fiscal and monetary policy of industrial nations and public and private debt burdens in developing and developed nations, suggest the world economy will grow at a modest rate during the next few years but with much slower growth than in the 1970s. That, along with limited inflation and moderate energy costs, should encourage modest growth in world utilization and exports of farm products. However the growth rate may be moderated by reduced incomes and foreign exchange earnings of oil exporting nations. In 1985-86, slightly over one-third of U.S. corn exports (including those sold to USSR) and one-fourth of U.S. wheat exports went to petroleum exporting countries. Unless major weather problems develop over a wide area, the emergence of new crop production technology and wider application of currently available technology appear likely to maintain the long-term upward trend in global crop production through the mid-1990s.

These prospects indicate that competition in world grain markets is likely to remain intense for the next few years. In the current world economic environment, grain exporters are facing strong pressures to maintain or expand their respective shares of world trade in order to maintain incomes of farmers and avoid costs of storing huge carryover stocks. These same pressures also exist in world markets for livestock, dairy, and poultry products as well as industrial goods. The net effect has been the emergence of one of the strongest predatory and protectionist trade environments since the late 1920s and early 1930s, with a very real danger that major farm product exporters will slip into an expanded trade war that will spill over into industrial products. Evidences of this environment include sharply increased export subsidies and export enhancement programs by U.S. and EC, threats of import restrictions to be imposed by U.S., EC, Canada, and other nations; strong negative sentiment toward industrial product imports into the U.S.; and major concern of the U.S. Congress about the large U.S. trade deficit.

This environment creates a need for caution in implementing policies related to trade and export subsidies. The lessons of the 1930s are a reminder that protectionist trade practices can lead to shrinking export markets and declining global economic activity. Similarly, the current export subsidy war carries the potential danger of a downward spiral in world farm product prices. That could occur if participants use increasingly large subsidies to attempt to expand their shares of a slowly growing export market and solve domestic farm problems at the same time that other participants are equally aggressive in defending their market shares.

The current world agricultural situation and prospects for the next few years suggest that an immediate return to the agricultural environment of the 1970s is unlikely. Instead, several more years may be required to bring equilibrium in the world supply and demand for major agricultural products and substantially improved world farm product prices. However, the downward trend in U.S. agricultural export volumes may have ended as a result of sharply reduced U.S. price support levels. Lower U.S. export prices and recent weakness in the exchange rate of the U.S. dollar should at least slightly improve the competitiveness of American farm product exports in the next few years, and should bring some expansion in domestic and foreign livestock and poultry feeding. These trends also appear likely to be reinforced by a gradually expanding world economy in the late 1980s.

In dealing with U.S. and global agriculture problems and in formulating appropriate policies, important linkages between agriculture and the general economy should be recognized. Trade is a two-way relationship in which one partner's purchases generate revenue to provide purchases and trade flows in the opposite direction. For example, clothing that U.S. consumers buy from southeast Asia or oil purchased from Mexico provides foreign exchange those nations can use to buy U.S. farm products. The size of the resulting purchases is influenced by the health of the U.S. and world economy, exchange rates, interest costs, and their impacts on foreign nations, and a number of other factors. Resolution of current U.S. and world agriculture problems will require monetary and fiscal policies aimed at stabilizing currency exchange rates and interest rates at realistic levels, promoting sustained economic growth and assisting developing nations in dealing with debt problems.

Even in a setting of global abundance and somewhat improved African crops in 1986-87, food shortages remain a serious problem in the world's poorest nations. Food security in a sizable part of the developing world thus is still an important agricultural policy issue and should not be overlooked in facing the problems of agricultural abundance in developed nations.

Introduction

n mid-1987, global grain exports appeared o be moving into a modest expansionary phase after several years of little or no upward trend. Increased world trade in grains at this writing stems from increased mports by China and several other developing nations. Increased Chinese imports eflect adverse weather in 1986 and early 987 as well as that nation's growing ndustrial economy. Other countries and areas with modestly increased import demand for grain include Korea, Taiwan, several Middle East and North African countries and a few Latin American nations. Modest growth in world exports and a dramatic shift to more aggressive U.S. export policies are permitting the U.S. to egain a small part of its global export shares lost during the first half of this decade. At the same time, large-scale U.S. and-idling programs, record government arm program payments, reduced input costs, and improved livestock feeding reurns are bringing a recovery in U.S. farm ncome and signs of a gradual improvement n the financial condition of U.S. production agriculture.

At the world level, grain utilization is continuing its nearly unbroken long-term upward trend that has been in place since 975-76. However, the recent pattern of growing self-sufficiency in importing nations s continuing, with much of the growth in global utilization being met by increased production in consuming nations. While competition from non-U.S. grain exporters has diminished slightly in 1986-87, most major shifts in trade patterns of recent years are continuing. EC has retained its recently acquired position as a net coarse grain exporter and is a major wheat exporter, along with modest net exports from India, Saudi Arabia, and several other former mporting nations. China's coarse grain exports have declined modestly from 985-86, although it still is expected to be a net exporter for the 1986-87 season. In addition, Pakistan, formerly a large wheat mporter, has attained self-sufficiency in wheat production and Brazil appears likely o become a net corn (maize) exporter again for the first time in several years. These patterns, along with sluggish growth n demand for livestock products in Western Europe, last year's expansion of the European Community (EC) to include Spain and Portugal, and continuing global debt problems suggest that competition in world food trade is likely to remain intense for the next few years.

In the trade policy area, the U.S. and EC have moved into a full-scale trade subsidy war with the U.S. offering discounts of up to $1.25 per bushel ($46 per metric ton) or more under to its wheat Export Enhancement Program along with large discounts on barley and sorghum. These programs through late spring 1987 had been extended to a wide range of importing nations including China, USSR, and several Middle East, North African, and Eastern European countries. These trade subsidies have been a factor in the modestly increased U.S. shares of global trade, although their cost has been substantial. Large government program costs to the U.S. and EC, and negative impacts on other exporters have created conditions that may foster constructive GATT (General Agreement of Tariffs and Trade) negotiations to deal with the current trade policy crisis. The U.S. and EC likely will be motivated to negotiate seriously in areas related to export subsidies and import restrictions because of burdensome domestic farm program costs. Other agricultural exporters have suffered strong negative impacts on their agricultural sectors and also are likely to be interested in negotiating more satisfactory procedures for resolving current trade problems.

Despite 1986-87 weather problems in parts of the Southern Hemisphere and China, global production of grains, oilseeds, poultry, and most other major agricultural products continued its long-term upward trend and modestly exceeded world utilization. As a result, global supplies of food remained ample, with global grain stocks reaching record levels in absolute terms and the highest level since 1960-61 as a percentage of annual utilization. African nations continued to see some improvement in food availability from severe problems of two years ago, although serious food problems remain in several sub-Saharan countries.

In this setting, several key questions remain important for U.S. and foreign policymakers, producers, and agribusiness managers as they plan for future farm programs and investment strategies. Key questions include:

1. Will foreign grain and oilseed producers respond to sharply reduced U.S. price support levels for major crops by reducing area planted and use of major imputs such as fertilizer in the next few years?

2. What forces may work to increase world demand and grain trade in the years immediately ahead, and what rate of growth is realistic for planning purposes?

3. What will be the longer-term global supply and demand for farm products with a continuation of current economic and trade policies?

4. Will the upward trend in U.S. shares of global grain and oilseed exports that began in 1986-87 continue in future years?

5. Will U.S. land-idling programs permit U.S. grain carryover stocks to be reduced in the next several years?

6. What U.S. and world economic policies are appropriate in dealing with the problems of sluggish growth in global agricultural trade, food security and international debt?

7. What impact will biotechnology have on future production and trade patterns?

8. What is the GATT organization and what can be expected from the GATT negotiations in the next few years?

This report brings into focus the complex linkages between U.S. agriculture and the world economy, and traces the impacts of the current world food situation on U.S. farm product exports. It also outlines major causes of the intense competition in export markets and provides historical perspective on the development of that competition. Information is provided to at least partly answer the key questions noted above, and to identify relationships of U.S. agriculture and agribusiness with the world financial system, energy prices, currency exchange rates, and domestic and trade policies of other nations.

1986-87 World Food Situation: Record Production, Modest Trade Increase, Record Stocks, and Continued Price Pressures

The world food situation in 1987 reflects continued stresses on global agriculture resulting from abundant world grain, oilseed, dairy, poultry, and livestock product supplies. World grain production set a new record high in 1986-87 for the third consecutive year, while world trade recovered only modestly from the previous year's sharp decline. Aggregate trade in all grains, while up 5 percent from 1985-86, remained 12 percent below the 1980-81 record. Sluggish trade brought continued stress on agricultural producers, farm supply and marketing firms, and agricultural lending institutions in the U.S. and several other major agricultural exporting nations, and the beginnings of significant structural changes in these industries. In the U.S., the net agricultural trade balance continued near the lowest level since the early 1970s. Major U.S. agricultural policy changes were implemented early in the 1986-87 trade year by means of the 1985 Food Security Act in an effort to halt the decline in U.S. farm product exports. These policies have begun to halt the decline in physical volume of the nation's agricultural exports, but low prices have prevented a large increase in the value of exports. Changing U.S. policies are continuing to have substantial impacts on agricultural producers, handlers, and government price support operations, not only in the U.S. but in many other grain-producing nations as well.

Other developments in the world agricultural scene include: (1) sharply rising costs of government farm programs in the U.S., Western Europe, and other areas; (2) continued frictions over the expansion of the European Community to include Spain and Portugal, with resulting grain and oilseed trade restrictions by those two major grain importers; (3) a slight easing of the international debt problem of some oil importing nations due to lower interest rates and moderate petroleum prices; (4) reduced purchasing power and a worsening of debt problems in some oil exporting developing nations; (5) an easing of input costs in U.S. agricultural production, including those for fuel, fertilizer, some chemicals, land rental rates, and used farm machinery; and (6) a sharp decline in the exchange rate of the U.S. dollar against West European and Japanese currencies. These developments appear likely to have a net positive impact on the competitive position of U.S. farm product exports in the next few years, although a return to the sustained rapid export growth rates of the 1970s appears unlikely in the immediate future.

African food shortages eased some in 1986-87 but remained serious in several countries as well as in parts of Latin America and other developing nations. Despite plentiful world supplies, there is a continuing long-term challenge in meeting the food needs of these nations.

Expansion of the European Community (EC), a slow increase in volume of world food trade, and reduced U.S. shares of global trade since the early 1980s, moved the U.S., Japan, and EC closer to a major trade policy confrontation in 1986-87, with potential negative impacts on other grain exporters. These conditions also have led the U.S. to pressure Japan to further reduce its import restrictions on farm and industrial products.

World Grain Trade Up Modestly

Table 1 shows the world supply and utilization of all grains in 1986-87 and comparisons with recent years. Preliminary data indicate aggregate world grain trade increased by 5 percent or 9 million metric tons from the previous season's depressed level, with global grain trade being the second lowest level in eight years. Increased trade reflected expanded imports by the Middle East and North Africa, China, and some other Pacific Rim countries. However, growth in trade was only about half as large as the average annual percentage rate of the decade of the 1970s. Soviet imports are estimated to have remained near the previous year's reduced level because of good grain and forage production in 1986.

World grain utilization increased moderately in 1986-87, reversing a slight downtrend in usage from the previous year and resuming the upward trend that had been maintained for 10 consecutive years through 1984-85. Aggregate world utilization increased by an estimated 4.0 percent, thus increasing per capita world grain utilization by slightly less than 2 percent. Increases in grain utilization are estimated to have occurred in Eastern Europe, USSR, People's Republic of China, Australia, Japan, Canada, the U.S., and Argentina during the trade year. Slightly more than one-sixth of the growth in world utilization is estimated to have occurred in the U.S., with domestic grain feeding to livestock and poultry being expanded by severely depressed grain prices, and with increased corn processing for sweeteners and alcohol fuel. At the same time grain utilization decreased slightly in Western Europe but increased modestly in a number of developing nations. World grain production in 1986-87 set a new record at 1,686 million metric tons, 1.3 percent above the previous season and nearly one-fourth larger than a decade earlier. The growth in production thus was slightly less rapid than

Table 1. Combined World Supplies, Utilization, Trade, and Stocks of All Grains in 1986-87, Projections for 1987-88, and Comparisons with Selected Recent Years in Millions of Metric Tons.

July-June Trade Years	Production	Utilization	Trade	Ending Stocks[a]	Stocks as % of Utilization
Projected					
1987-88	1,642	1,653	199	382	23.1
Preliminary					
1986-87	1,686	1,639	190	392	23.9
1985-86	1,665	1,575	181	346	22.0
1984-85	1,645	1,593	219	256	16.1
1983-84	1,485	1,553	208	204	13.1
1982-83	1,548	1,505	201	271	18.0
1981-82	1,497	1,464	210	229	15.6
1980-81	1,447	1,461	215	196	13.4
1979-80	1,428	1,451	198	210	14.5
1978-79	1,466	1,436	177	232	16.2
1976-77	1,363	1,309	158	204	15.6
1971-72	1,197	1,179	110	183	15.5
1966-67	1,006	980	104	169	17.2
1960-61	846	832	72	199	24.0

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 7-87, June 1987. Includes wheat, milled rice, and coarse grains.

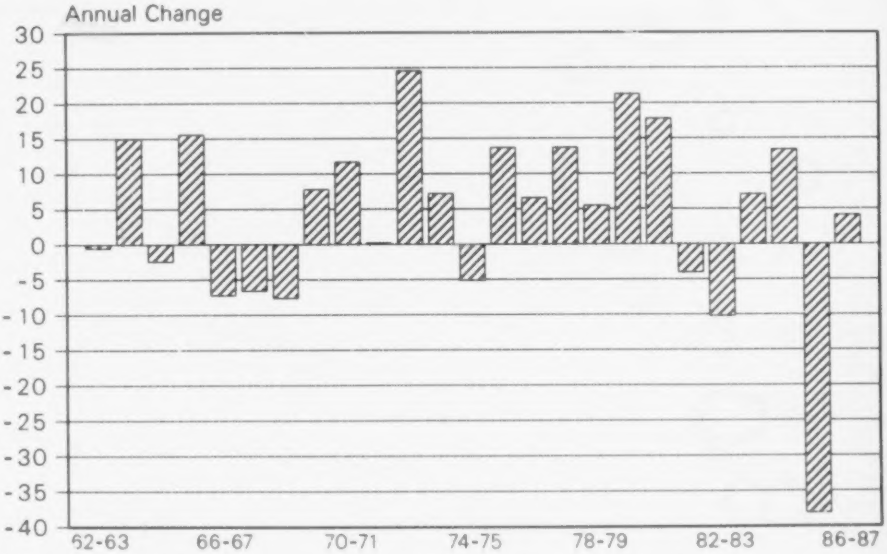
[a] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

average for the previous decade and ged slightly behind world population wth. However, record production was hieved despite the smallest global area voted to grain since the 1983-84 U.S. yment-in-Kind (PIK) program and the cond smallest world grain harvested area ce 1974-75. Reduced plantings reflected gressive U.S. land-idling programs and fts to oilseed production in some areas. ain production fell below the previous ar in parts of Western and Eastern rope and Argentina in 1986-87, as a ult of less favorable weather, and in U.S., cause of farm programs that removed d from production. However, reduced oduction in these areas was more than set by larger grain crops in USSR, nada, South Africa, Pakistan, and several er developing nations. World production 1986-87 is estimated to have been 3 rcent above utilization, although the gap tween production and utilization narrowed m the previous year.

h production exceeding utilization, global ain carryover stocks continued to trend ward in 1986-87 for the fourth con-cutive year. Preliminary data place world ain stocks (excluding those in USSR, ina, and certain other centrally planned ions) at 24 percent of total annual ization, moderately above the level gen-lly considered adequate for world food curity, the highest in over two and one-f decades and well above the level of the 70s.' As has been the usual pattern when rld production exceeds utilization, a ge part of the increase in world grain cks is occurring in the U.S. where grain cks are accumulating under various vernment programs. Rising carryover cks placed sharp downward pressure on S. and world grain prices in 1986-87, with ntinued relatively weak prices being pos-le in the 1987-88 trade year if growing nditions are average or better in most jor grain-producing regions of the world.

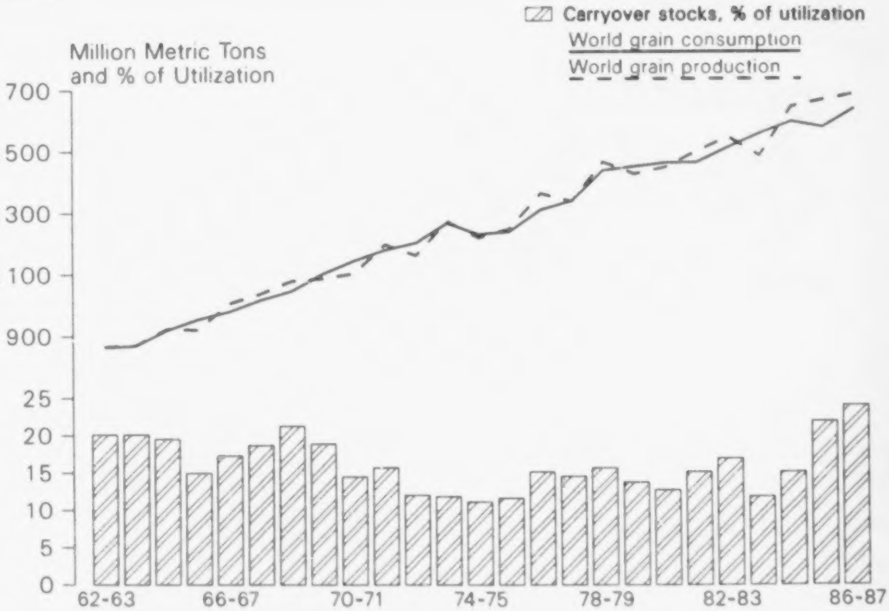
ure 1 compares the change in 1986-87 rld grain exports with the pattern of the st two and one-half decades. The mod-increase followed a record decline in bal exports in the previous trade year t was three times as large as the vious record decline in 1982-83 and arly four times as large as the sharp clines in trade that occurred in the mid-late 1960s.

Figure 1. Annual Change in Total World Grain Trade, 1962-63 through 1986-87 in Millions of Metric Tons.



Source: Compiled from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 5-87, April 1987.

Figure 2. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June 1962-63 to 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 5-87, April 1987 and various other issues.

Short and Intermediate Term Prospects

U.S. grain production in 1987 appears virtually certain to drop moderately below the previous year as a result of U.S. government policies encouraging American farmers to remove land from production and the likelihood that yields will be somewhat reduced from the 1985 and 1986 record levels. Early reports indicate Soviet winter grain prospects are below last year, and that nation has shown a strong tendency toward an alternating pattern of favorable crops followed by less favorable production the next year. In addition, early indicators point to some possible decline in Australia's grain harvest in 1987-88. Reduced crops in these areas may offset or partially offset improved production in areas that experienced adverse weather last season, and may temporarily slow or halt the upward trend in global grain production in the year ahead. However, improved crop production and management practices, and wider geographic application of currently available technology appear likely to maintain the long-term upward trend of global grain yields and production in the late 1980s and early 1990s.

World consumption appears likely to continue its long-term upward trend as a result of a growing world population, and a slight stimulus to world economic growth stemming from lower energy costs and interest rates (see Figure 2). However, several major importing nations have increased domestic grain production in recent years, thus reducing their grain import requirements. This trend may slow in the next few years, but still appears likely to hold growth rates in world trade well below those of the 1970s for the next few years. Growth trends and stability of world grain trade also will be influenced by the success of recent policy changes in USSR that are designed to stimulate lagging productivity in its grain sector. Soviet imports currently are large, highly variable from year to year, and are a major influence on the level of aggregate world grain trade.

World Wheat Production Down, Stocks Continue to Rise in 1986-87

World wheat production increased by an unusually large 6 percent in 1986-87, after declining slightly in the previous year. Production increased in Argentina, China, Australia, Canada, USSR, and Eastern Europe. However, with global wheat production slightly exceeding the increased global utilization, global wheat stocks continued the upward trend of the past six years, both in absolute size and as a percentage of annual world utilization (see Table 2). Nearly two-fifths of the 6 percent increase reflected increased feeding of wheat to livestock and poultry because of depressed prices.

With increased feed and food utilization, use of wheat in 1986-87 resumed the long-term upward trend that had turned down temporarily in 1985-86. Preliminary data indicate wheat utilization increased in the 1986-87 trade year in the U.S., China, EC, Eastern Europe, USSR, Australia, and Argentina, as well as some other developing nations. Global wheat utilization in 1986-87, estimated to be the highest on record, was up 34 percent from a decade earlier.

World wheat carryover stocks, in absolute terms, are establishing a new record in the trade year just ending. When related to annual utilization, however, the stocks appear slightly less burdensome. They represent approximately 29 percent of annual utilization, the largest since 1969-70 but still below the 30 to 38 percent level of the late 1960s. In an unusual pattern, the buildup of wheat stocks during the past year is estimated to have occurred entirely outside the U.S., with U.S. carryover stocks down 1.5 million metric tons and global stocks estimated to be up 12 million tons. Wheat carryover stocks are estimated to have increased during the year in Canada and Argentina, two major non-U.S. exporters. Stocks are believed to have remained approximately constant in Eastern Europe, increased slightly in India and USSR, and declined in EC, Australia, and China.

The slightly reduced U.S. wheat stocks reflected a slightly enlarged U.S. share of the world wheat trade in 1986-87. Wheat exports by the U.S. increased by about 3 million metric tons or 12 percent during the year, while total non-U.S. exports increased by only 3 percent or 2 million metric tons (see Figure 3). Thus, the U.S. share of global wheat trade increased from 25.9 percent the previous year to 27.6 percent in

Table 2. World Wheat Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1987-88 and Selected Recent Years.

July-June Trade Years	Production	Utilization	U.S Exports	Non-U.S. Exports	Total Trade	Ending Stocks[a]	Stocks as % of Utilization
Projected							
1987-88	508.8	506.9	33.3	63.6	96.9	150.4	29.7
Preliminary							
1986-87	529.2	517.4	27.9	62.7	90.6	148.6	28.7
1985-86	498.8	487.3	24.9	60.0	84.9	136.8	28.1
1984-85	511.5	495.6	38.8	68.2	107.0	125.4	25.3
1983-84	489.3	482.2	38.9	63.1	102.0	109.5	22.7
1982-83	477.3	462.0	41.1	57.6	98.7	102.3	22.1
1981-82	449.5	443.6	48.2	53.1	101.3	87.0	19.6
1980-81	443.0	443.8	41.2	52.9	94.1	81.2	18.3
1979-80	424.5	443.4	37.4	48.6	86.0	82.0	18.5
1978-79	446.9	430.2	32.5	39.5	72.0	100.9	23.4
1976-77	421.4	385.9	25.9	37.4	63.3	100.8	26.1
1971-72	351.0	344.3	16.3	35.7	52.0	81.0	23.5
1966-67	306.7	279.8	20.3	35.7	56.0	82.1	29.4
1960-61	238.4	234.8	19.6	22.3	41.9	81.8	34.8

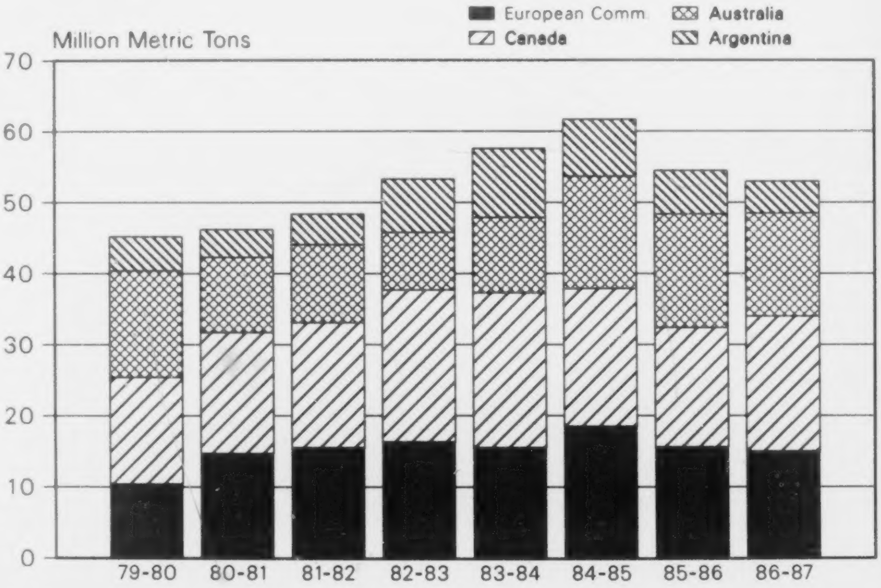
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 7-87, June 1987; various other issues.
Includes wheat and wheat products.
[a] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

1986-87. The modestly increased U.S. trade share, after several years of trending downward, reflected a major change in U.S. agricultural policies including sharply lower price support levels, increased direct government payments to farmers, and greatly expanded export enhancement programs. These policy changes as the U.S. attempted to regain lost shares of global wheat trade also contributed to the heightening tensions between the U.S. and the EC over trade policies and EC export subsidies. The first test of the effectiveness of changing U.S. trade and farm policies occurred in the 1986-87 trade year, when the $.90 per bushel ($33.12 per metric ton) decrease in the U.S. price support level and an accelerated Export Payment-in-Kind program began to impact on world wheat markets and the competitiveness of U.S. wheat. While many U.S. policymakers had hoped for more substantial gains, results of the past year indicate changes in U.S. farm programs are having some impact on its competitive position in world wheat trade.

World Coarse Grain Supplies Continue To Rise, Stocks Set New Record

Global coarse grain (feed grain) production decreased slightly in 1986-87 after a sharp increase the previous year, with total output dropping 0.8 percent below the previous year but remaining 19 percent above the level of 10 years earlier (see Table 3). Much of the decrease in production reflected reduced plantings in the U.S., with its coarse grain output down 22 million metric tons and world production down 6.6 million tons from 1985-86. Countries and regions reporting increased coarse grain production in 1986-87 included USSR, Eastern Europe, China, Canada, and South Africa. Larger crops in these nations approximately offset reduced production in Argentina and West-

Figure 3. Wheat Exports by Major Non-U.S. Exporters, July-June 1986-87 and Comparisons with Recent Years in Millions of Metric Tons.[a]



Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 21-83, July 14, 1983; FG 5-86, May 1986.
[a]From 1982-83 on, the EC is EC-12.

Table 3. World Coarse Grain Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1987-88 and Selected Recent Years.

July-June Trade Years	Production	Utilization	U.S. Exports[a]	Non-U.S. Exports	Total Trade[b]	Ending Stocks[c]	Stocks as % of Utilization
Projected							
1987-88	810.4	821.5	49.1	40.9	90.0	210.5	25.6
Preliminary							
1986-87	839.1	800.4	45.2	42.2	87.4	221.6	27.7
1985-86	845.7	770.6	36.6	46.7	83.3	182.9	23.7
1984-85	814.0	783.1	56.6	44.1	100.7	107.8	13.8
1983-84	686.8	761.7	56.6	36.5	93.1	77.0	10.1
1982-83	784.2	752.9	53.0	36.9	89.9	151.9	20.2
1981-82	766.3	738.2	60.0	36.6	96.6	120.4	16.3
1980-81	732.0	743.9	70.7	37.1	107.8	92.4	12.4
1979-80	744.4	743.8	71.0	28.2	99.2	104.1	14.0
1978-79	755.1	746.8	59.5	33.2	92.7	103.6	13.9
1976-77	704.8	685.1	50.1	33.8	83.9	85.1	12.4
1971-72	629.1	615.4	24.2	25.1	49.3	87.0	14.1
1966-67	520.4	519.5	20.0	20.0	40.0	76.1	14.7
1960-61	447.9	437.2	15.7	8.3	24.0	109.7	25.1

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 7-87, June 1987; various other issues.
[a]Based on market years.
[b]From 1976-77 on, the trade year is October-September.
[c]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

ern Europe. Coarse grain output exceeded world utilization by approximately 5 percent and produced the second-largest one-year increase in carryover stocks ever recorded, exceeded only by the increase in 1985-86. Global stocks (excluding those in USSR, Eastern Europe, and China, for which no data are available) rose by an exceptionally large 21 percent from a year earlier.

As has been the case in previous years of surplus world production, most of the buildup of stocks occurred in the U.S.[2] U.S. coarse grain carryover stocks are projected to increase by 26 percent by fall 1987, rising approximately 30 million metric tons above a year earlier while non-U.S. stocks are projected to increase by only about 9 million metric tons. With the U.S. coarse grain sector still performing most of the burden of keeping excess world stocks out of the market, the U.S. administration will be under increasing pressure to use newly acquired policy tools to force at least part of these stocks into world markets. These U.S. tools will be discussed in a later section of this report that reviews the 1985 Food Security Act passed by the U.S. Congress in December 1985.

World coarse grain consumption increased by slightly less than 4 percent in 1986-87, slightly exceeding the annual world population growth rate and accelerating from a near-absence of growth in utilization the previous 3 years. Increased coarse grain utilization is reported to have occurred in USSR, China, Eastern Europe, U.S., Canada and several developing nations. Increased utilization in these areas is offsetting decreased utilization in parts of Western Europe. The modest growth in world coarse grain utilization reflected a slight expansion in global livestock and poultry output, and a likely substitution of grain for forage in some areas because of severely depressed coarse grain prices. U.S. prices for maize (corn) at times during the trade year reached a 15-year low.

In the trade picture, U.S. exports rebounded slightly after a six-year downward trend to the lowest levels since 1974-75. The U.S. trade share in coarse grains also increased slightly in 1986-87, with U.S. exports expected to increase by approximately 7 million metric tons at the same time that aggregate non-U.S. coarse grain exports decreased by an estimated 6.2 million tons (see Figure 4). Large losses in the U.S. coarse grain export share since the late 1970s, however, will place strong pressure on the U.S. administration to take additional policy actions in coarse grains to compete more aggressively with other exporting nations.

A significant factor in the increased U.S. coarse grain exports in 1986-87 was the sharp decline in U.S. coarse grain price support levels implemented in the fall of 1986 as the U.S. Food Security Act of 1985 went into effect. The effective U.S. price support loan rate for 1986-crop corn (the most important U.S. coarse grain) declined $.71 per bushel ($27.96 per metric ton) due to combined effects on reduced support levels and balanced-budget legislation. Support levels for other coarse grains were reduced by similar percentages, and other policy tools pushed U.S. prices sharply below even the new lower government support levels. Since U.S. prices are a major influence on world price levels, the U.S. support level reduction has signaled competing exporters to slow or halt expansion of their production, and may lead to additional gains in the U.S. share of global coarse grain trade in future years. Low prices should also encourage slightly accelerated growth of global coarse grain utilization by making livestock and poultry products slightly more affordable to world consumers.

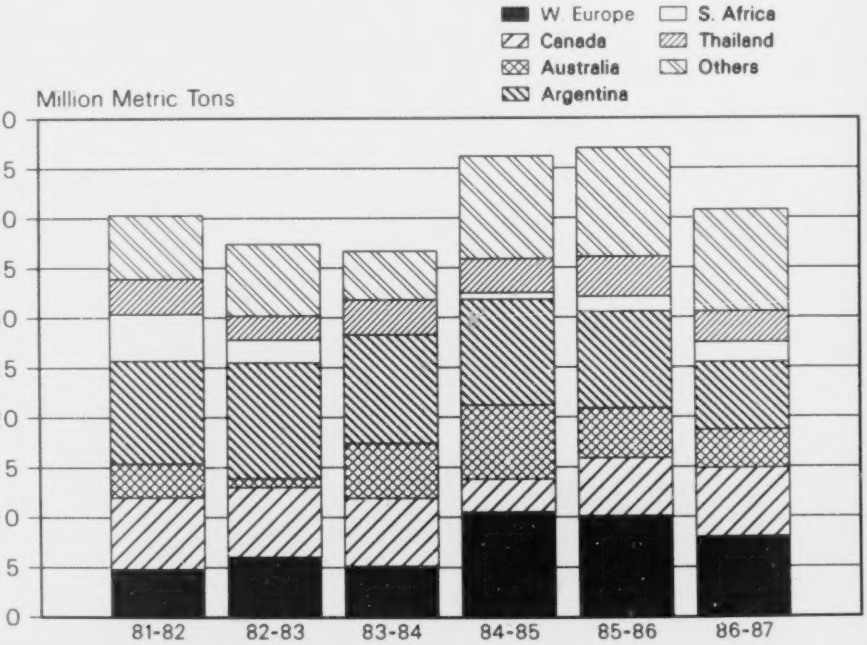
World Rice Production Down Slightly but Still Large

Global production of rice declined slightly in 1986-87, for the second time in seven years. Despite the decline, production was still the third largest on record, 2.7 percent above three years earlier, but slightly below aggregate world consumption (see Table 4). As a result, world rice stocks are expected to decline slightly both in absolute size and as a percent of annual utilization by the end of the 1986-87 trade year. Reduced production reflected smaller crops in India, Indonesia, and Thailand, which were nearly offset by increased production in Pakistan, Brazil, China, and Bangladesh.

World rice consumption increased slightly in 1986-87 after briefly leveling off the previous year from a steady and unbroken upward trend that had been in effect since 1972-73. Much of the increase in utilization in 1986-87 occurred in China, the world's largest rice-consuming nation.

Reported global rice stocks are projected at 22 million metric tons, 14 percent below last year. Stocks at this level are equivalent to 6.9 percent of annual utilization, slightly below the 8 to 9 percent level of the late 1960s. However, it should be noted that

Figure 4. Coarse Grain Exports by Major Non-U.S. Exporters, October-September 1986-87 and Comparisons with Recent Years in Millions of Metric Tons.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 7-84, April 1984; FG 5-86, May 1986; FG-5-87, April 1987.

officially reported stocks exclude those of North Korea, Laos, Vietnam, and China, where official stocks data are not published. These four nations produce approximately 60 percent of the world's rice output. Exclusion of their stocks almost certainly understates world stocks by a substantial margin. Ending U.S. rice stocks in 1986-87 also are projected to decline by 19 percent, more than the rate of decline at the world level. The U.S. accounts for less than 2 percent of the world rice production, but is a major exporter of this commodity.

World rice exports are projected to decrease by about 7 percent in the 1986-87 trade year. As with other grains, the U.S. share of global rice exports is increasing slightly after several years of a steep downtrend. U.S. rice exports are expected to drop 4 percent below the 1986 level while non-U.S. exports are projected to decrease by about 12 percent.

The U.S. still retains its position as the world's second largest rice exporter, with Thailand being the largest exporter of that commodity. Other leading rice exporters include the EC, China, Thailand, and Burma.[3] Rice exports from China, Thailand, EC, and Pakistan are expected to be moderately below last year. U.S. rice exports are expected to be down 13 percent from the peak level of six years earlier. Total non-U.S. exports, on the other hand, are expected to be 9 percent below 1980-81. The shrinking U.S. share of global rice trade in the first half of the 1980s was a major factor behind dramatic changes in U.S. price support policies, which parallel those of other grains, and will be discussed in a later section of this report. U.S. price support programs were changed in 1986-87 to permit sharply lower cash prices that compete more effectively with foreign exporters. At the same time, incomes of U.S. producers are being supported by increased direct government payments that compensate them for idling part of their cropland. These policy changes seem likely to at least slightly reverse earlier declines in the U.S. share of world rice trade over the next few years.

Among major importers, Bangladesh is projected to double its rice imports in 1987 because of adverse weather and reduced production. However, more favorable weather and increased production are expected to sharply reduce Brazil's imports. Decreases of 14 and 10 percent, respectively, are projected for EC and Vietnam. Reduced imports by these nations are partially offset by anticipated 25 percent increases in Nigerian rice imports along with moderately larger imports by Iraq, China, Mexico, Malaysia, Peru, and Sri Lanka.

For the longer term, world rice production and consumption appear likely to continue their nearly steady upward trend. Increased consumption will be generated by relatively rapid population growth rates in many major rice consuming nations. Technological developments and increased application of currently available technology appear likely to maintain the upward trend of global production for the next several years, in the absence of widespread adverse weather in key rice growing areas. Prospects for growth in world trade in rice are less certain and may be restrained some by increased production in importing nations.

World Oilseed Production, Exports, Stocks Trend Slightly Upward

Preliminary estimates indicate aggregate world production of eight major oilseeds rose to a record 196.74 million metric tons in 1986-87. That reflects an increase of 0.4 percent from the record level of a year ago and a 10 percent increase from four years earlier. Production of soybeans, rapeseed, and flaxseed increased significantly from the previous year, partly as a result of favorable weather in several major producing regions. The increase in soybean production was concentrated largely in Brazil, China, and Argentina, where increases of 22, 12, and 3 percent, respectively, more than offset an estimated 4 percent decline from the previous year in U.S. production. The slight decline in U.S. production was due to reduced plantings, while increased Brazilian production reflected much more favorable weather than in the previous year. In contrast to soybeans and rapeseed, world cottonseed production declined by approximately 12 percent for the second consecutive year. The smaller cottonseed crop was due mainly to reduced area harvested and lower yields in China, U.S., USSR, and Brazil because of adverse

Table 4. World Milled Rice Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1987-88 and Selected Recent Years.

July-June Trade Years	Production	Utilization	U.S. Exports[a]	Non-U.S. Exports[a]	Total Trade[a]	Ending Stocks[b]	Stocks as % of Utilization
Projected							
1987-88	323.3	324.2	2.5	9.7	12.2	20.7	6.4
Preliminary							
1986-87	317.2	320.9	2.6	9.2	11.8	22.1	6.9
1985-86	320.4	316.9	1.9	10.8	12.7	25.8	8.1
1984-85	319.2	314.1	2.0	9.5	11.5	22.3	7.1
1983-84	308.8	308.8	2.3	10.3	12.6	17.2	5.6
1982-83	286.3	290.3	2.2	9.7	11.9	17.3	6.0
1981-82	281.7	282.5	2.7	9.1	11.8	21.4	7.6
1980-81	271.6	272.9	3.0	10.1	13.1	22.1	8.1
1979-80	258.9	263.3	2.7	10.0	12.7	23.4	8.9
1978-79	264.2	259.1	2.4	9.6	12.0	27.9	10.8
1976-77	236.9	238.4	2.1	8.5	10.6	17.8	7.4
1971-72	216.4	218.8	1.8	6.9	8.7	15.4	7.0
1966-67	179.3	180.7	1.7	6.1	7.8	10.6	5.9
1961-62	147.3	147.7	0.9	5.4	6.3	7.0	4.8

Source: U.S. Department of Agriculture, Foreign Agriculture Service, *Foreign Agricultural Circular, Grains*, (Washington, D.C.), FG 5-87, April 1987.

[a] Exports are computed on an August-July year basis.

[b] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

weather in those countries. The world's leading cotton and cottonseed producers, in order of size, continue to be China, USSR, U.S., India, Pakistan, and Brazil. Sunflowerseed production fell an estimated 0.9 percent below the previous year as a result of reduced production in Argentina, U.S., and China. Declines in these countries were nearly offset by increased production in EC, Eastern Europe, and USSR. Rapeseed production expanded substantially in China, Canada, and India as a result of favorable weather and increased area planted. EC rapeseed production stabilized after a sharp upward trend in recent years. Palm kernel and copra production decreased slightly in response to slightly less favorable weather than the previous year in Malaysia and the Philippines, which are major producers of these products.

Global exports of major oilseeds, according to preliminary projections by the U.S. Department of Agriculture, have continued an upward trend in 1986-87 after a three-year downtrend that ended in 1984-85.[4] Preliminary data in Table 5 indicate aggregate exports will be 5 percent higher than in 1985-86 as a result of increased Soviet imports, slightly improved meal demand in Europe and the Far East, and prices in West European markets that are more competitive with other feed ingredients as a result of the sharp decline in the exchange rate of the U.S. dollar. Global carryover stocks of major oilseeds at the end of the 1986-87 trade year are projected to be 3 percent larger than the record stocks of a year earlier. Stocks at that level would represent about 18 percent of total annual utilization. Most of the increase in oilseed stocks is expected to be in soybeans, with larger stocks of that commodity concentrated primarily in the U.S. Smaller increases in carryover stocks of sunflowerseed, rapeseed, and flaxseed also are expected. Unlike grains, U.S. soybean exports are declining slightly in 1986-87, while aggregate non-U.S. exports are increasing. The decline in U.S. exports is due largely to a sharp increase in Brazil's March-May 1987 soybean harvest, which was the result of excellent weather during the main growing season.

In 1986-87, production of major protein meals has increased slightly from a year earlier, while preliminary data show a slight decline in major vegetable and marine oil production (see Tables 5 and 6.) Smaller decreases in oil production reflect reduced output of palm, cottonseed, coconut, and olive oil. Most of these products are oilseeds high in oil content. In contrast, soybeans have a relatively low oil content and higher meal yield per ton, and increased soybean production has increased 1986-87 world protein meal production.[5] Despite slightly reduced oil production, slow growth in world demand and competition from large butter stocks have caused a slight increase in U.S. and world soybean oil stocks and have kept soybean oil and other vegetable oil prices (in current U.S. dollars) at relatively low levels. In contrast to soybean oil, global stocks of most other vegetable oils and total fats and oil stocks are expected to be the second highest on record but slightly below a year earlier.

Ending world protein meal stocks in 1986-87 also are expected to be modestly below levels a year earlier. Declining stocks have caused processors to crush oilseeds more for meal than for oil, with meal providing a larger share of the value of oilseeds than last season. With a relatively tighter supply situation in meal than in oil, 1986-87 meal prices have been modestly above the previous year but generally below levels of the mid to late 1970s. Meal demand continues to be restrained some-

Table 5. World Oilseed Production, Crush, Trade, and Carryover Stocks in Millions of Metric Tons in 1986-87 and Selected Recent Years.

July-June Trade Years	Production	Crush	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks	Stocks as % of Crush
Projected							
1986-87	196.74	156.38	19.88	16.00	35.88	27.40	17.52
1985-86	195.98	153.85	20.99	13.29	34.28	26.70	17.35
1984-85	191.03	150.69	17.72	15.21	32.93	21.25	14.10
1983-84	165.66	136.68	21.64	11.36	33.00	15.80	11.56
1982-83	178.19	143.51	26.32	8.85	35.17	20.49	14.28
1981-82	169.35	138.33	27.14	14.27	35.84	18.89	13.66
1980-81	155.52	132.61	21.57	10.56	32.13	20.48	15.44
1979-80	170.15	133.77	26.21	9.80	36.01	19.33	14.45

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 7-87, July 1987; FOP 4-85, April 1985, and FOP 5-84, May 1984.

Table 6. World, U.S., and Foreign Production of Oilseed Products in 1972-73, 1979-80, 1982-83, 1985-86, and 1986-87 in Millions of Metric Tons.

	44% Protein Meal Equivalent						Fat and Oil Production[a]					
	1972-73	1979-80	1982-83	1985-86	1986-87	% Change 1972-86	1972-73	1979-80	1982-83	1985-86	1986-87	% Change 1972-86
U.S.	17.8	27.3	26.6	25.0	26.1	+46.6	7.8	10.4	10.3	10.0	10.0	+28.2
Non-U.S.	35.6	58.8	60.7	66.0	66.4	+86.5	30.6	41.6	44.3	50.5	50.4	+64.7
World Total	53.4	86.1	87.3	91.0	92.5	+73.2	38.4	52.0	54.6	60.5	60.4	+57.3

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Oilseeds and Products*, FOP 4-87, April 1987; FOP 25-77, December 1977; and personal communication with officials of U.S. Department of Agriculture.

[a] Excluding linseed oil.

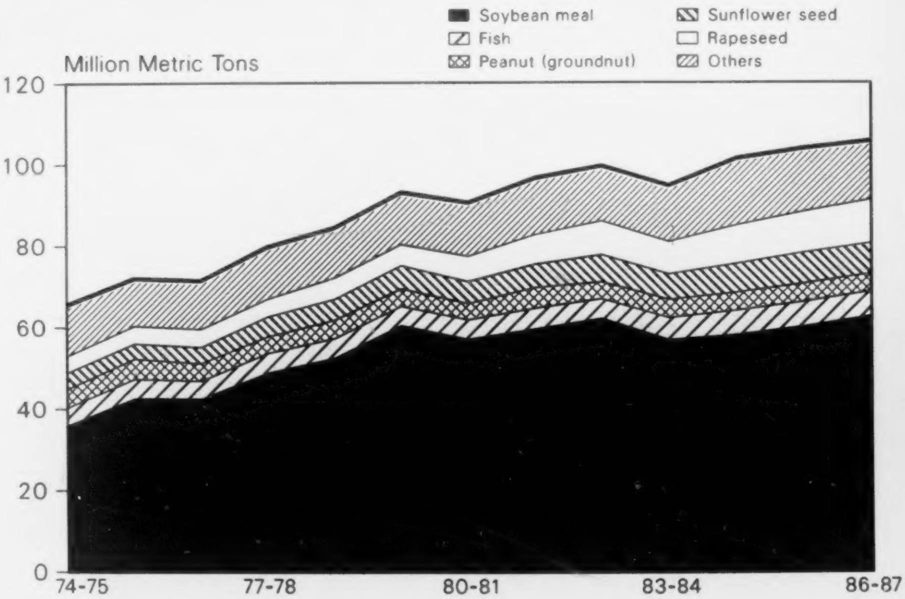
what by extensive wheat feeding in many areas. Wheat has a higher protein content than corn, thus reducing the need for supplemental protein meal when it is used to replace corn in livestock and poultry rations. Early indications point to a slight tightening of world vegetable oil supplies in the year ahead, but with protein meal remaining in slightly tighter supply than oil through at least April 1988. Meal supplies after April 1988 will depend heavily on new-crop soybean production in Brazil and Argentina. Favorable weather in these two countries could lead to some further easing of tightness in meal supplies from late April 1988 onward.

As Figure 5 indicates, much of the long-term growth in world protein meal production has come from soybean meal. That pattern appears likely to continue in the year ahead and over the next several years, with an upward trend in soybean production in South America, and probably in the U.S. over the longer term. However, with large world wheat supplies and potentially higher yields through expanded use of hybrid varieties, wheat feeding may remain relatively high in the next few years. That, along with slower growth in the world economy and continued global debt problems, may lead to slightly slower growth in the world demand for soybean meal than in the 1970s.

Figure 6 indicates that soybean oil has faced much greater competition from other products in world markets than has been the case with soybean meal. Soybean oil production continues to be larger than that of any other individual vegetable, marine, or animal fat or oil. But combined production of all other fats and oils is nearly four times as large as soybean oil. In the years immediately ahead, soybean meal will likely remain as the dominant source of protein meal for livestock and poultry feeding. However, expanded palm tree plantings in Malaysia and interest in similar plantings in other tropical nations suggest that a significant part of the growth in world demand for vegetable oils will be supplied by palm oil during the next 5 to 10 years.[6]

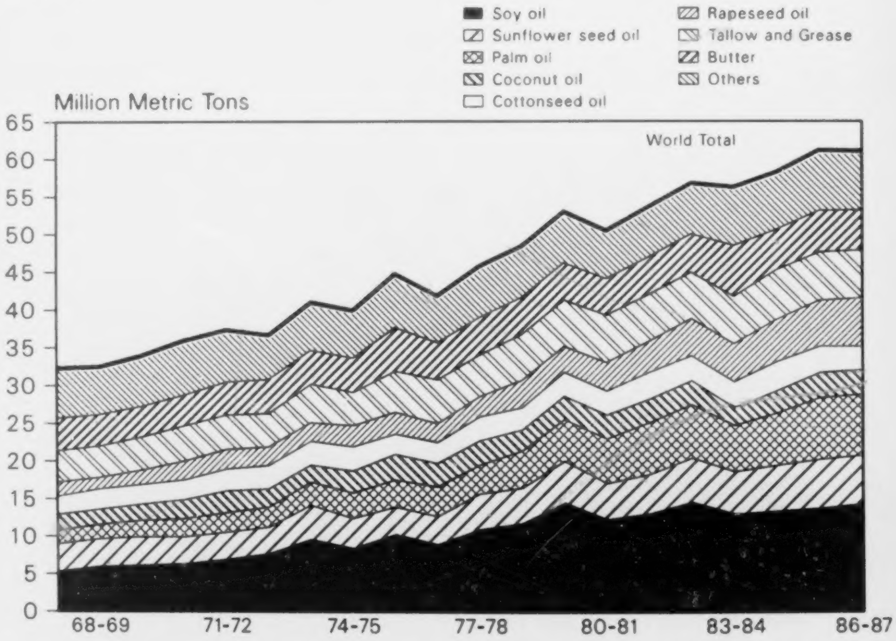
Figures 7 through 9 show the trend in major geographical origins of soybean, soybean meal, and soybean oil exports. Non-U.S. soybean exports have trended moderately upward since the early 1970s, primarily originating from Brazil and Argentina. However, U.S. exports of unprocessed soybeans continue to be much larger than either of these two nations and have shown a long-term upward trend.

Figure 5. World Protein Meal Production by Type of Product, 1974-75 through 1986-87.



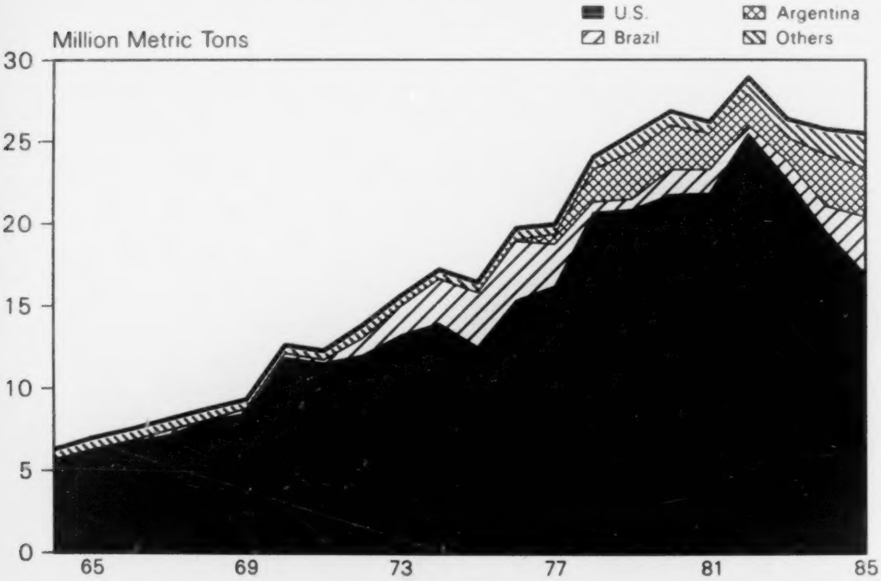
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 4-87, April 1987 and personal communications with officials of U.S. Department of Agriculture.

Figure 6. World Fat and Oil Production by Type of Product, 1966-67 through 1986-87.



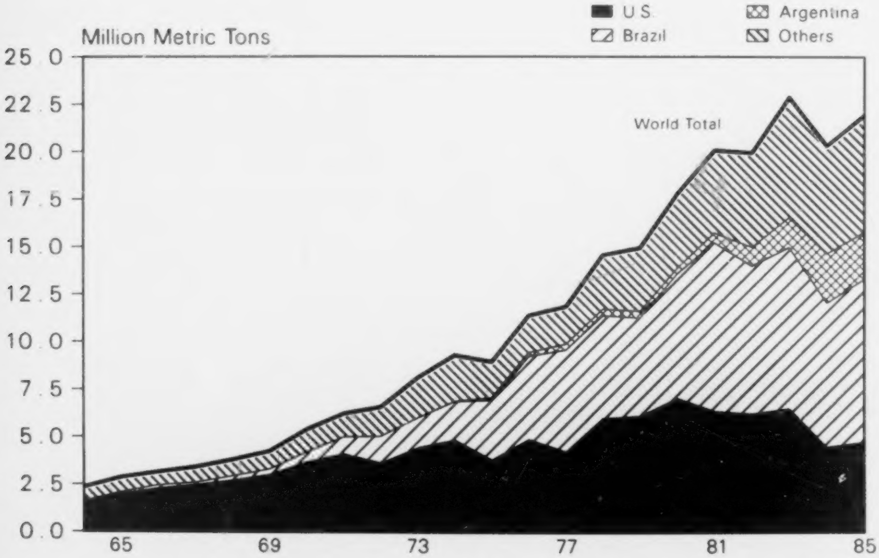
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 4-87, April 1987 and various other issues.

Figure 7. World Soybean Exports by Country of Origin, Calendar Years 1963-85.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

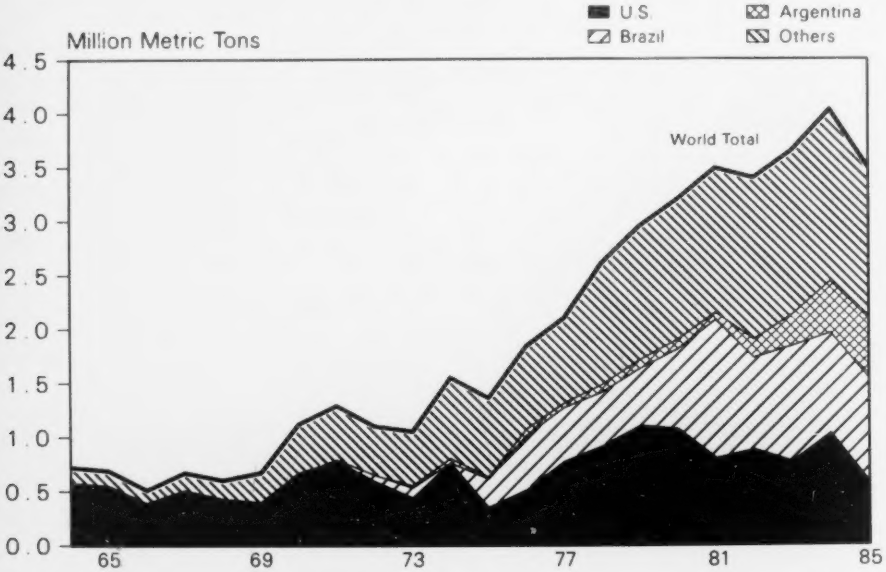
Figure 8. World Soybean Cake Exports by Country of Origin, Calendar Years 1963-85.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

World soybean meal and oil patterns, in contrast, show relatively steady U.S. exports, and sharply expanded exports by Brazil, Argentina, and other nations. The Other categories in Figures 8 and 9 consist mainly of EC, Spain, and Portugal, where U.S. and South American soybeans are processed and a portion of the resulting meal and oil production is re-exported. This pattern indicates the U.S. soybean processing industry has been largely denied participation in the growth in world demand for its value-added exports. Growth of foreign soybean processing capacity has been encouraged partly by differential export or import taxes on products versus unprocessed soybeans.[7] Barring major changes in trade policies, the U.S. soybean processing industry is likely to face continued strong competition from non-U.S. processors in the years ahead.

Figure 9. World Soybean Oil Exports by Country of Origin, Calendar Years 1963-85.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

Long-Term Trend in World Grain Area and Yields

World harvested grain area has trended slowly upward during the last several decades through more extensive cropping practices, shifts from pasture to grain production, drainage of wet areas, land clearing in parts of the U.S. and South America, and increased use of irrigation to convert arid or semi-arid areas to crop production. Year-to-year changes in the world's cropland base resulting from such adjustments are relatively small. However, over a one- or two-decade timespan, the impact can be sizable and has contributed to the long-term upward trend in global food production. The long-term trend toward increased grain area being harvested was interrupted, at least temporarily, in 1986-87 and probably will be interrupted again in 1987-88. U.S. harvested area of grains declined by 5.6 million hectares in 1986-87 as a result of increased government program incentives that encouraged U.S. farmers to remove cropland from production. Preliminary data indicate an additional decline of about 7.9 million hectares has occurred in U.S. grain area in 1987-88 with increased government program incentives to idle land.[8] At the same time, foreign farmers in total expanded the area devoted to grain production in 1986-87 by 1.1 million hectares, so that world harvested area devoted to grain in 1986-87 fell 2.7 million hectares below a year earlier. The upward trend may continue to be restrained in the next 4 to 8 years because of more aggressive U.S. use of short- and long-term land idling programs, and reduced economic incentives for land clearing in Brazil.

Wheat and Coarse Grain Area Both Decline

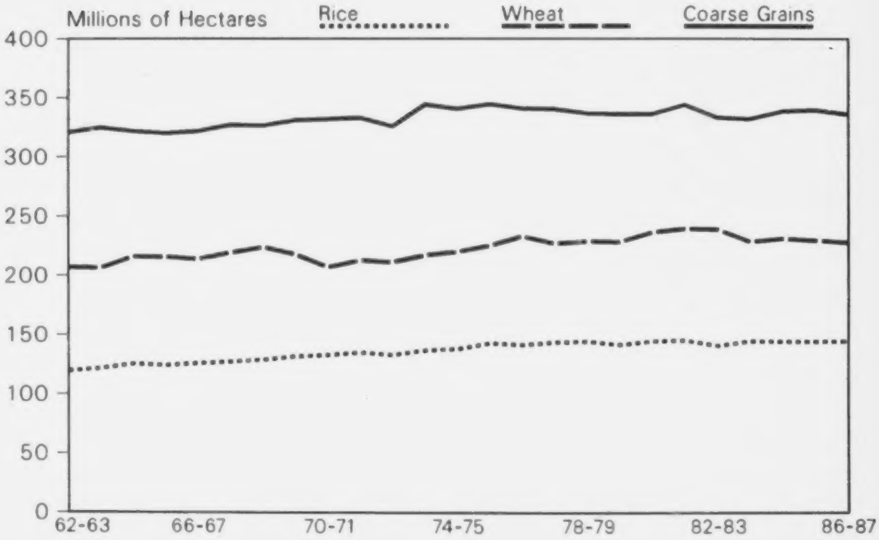
Table 7 indicates coarse grain area harvested declined slightly in several countries in 1986-87, with reductions in the U.S., Argentina, Thailand, and Australia. Global area harvested, as shown in Figure 10, was 0.9 percent below a year earlier but 5 percent above two decades earlier and 3.6 percent below the global record reached in 1975-76. World wheat area harvested in 1986-87 dropped 0.7 percent below a year earlier, and was down 2 percent from one decade earlier but up 7 percent from two decades ago. Wheat area in the U.S. declined slightly in 1986-87 in response to government program incentives, along with decreases in USSR, Argentina, and Australia, as shown in Table 7. Wheat area expanded slightly in Canada, EC, and Eastern Europe. World rice area increased slightly in 1986-87 and was 2 percent above the level of 10 years earlier. Total world grain area harvested reached a record high in 1981-82, and has declined by 3.4 percent or 24.7 million hectares since that time, with reductions in the area devoted to each of the three major categories of grain: wheat, rice, and coarse grains. Forty-three percent of the decline in global harvested grain acreage since 1981-82 can be accounted for by U.S. land idling programs.

Europe, Canada, Expand Wheat Area

The U.S. Payment-in-Kind program reduced U.S. wheat area harvested in 1983-84 by 23 percent as farmers received government grain in return for reducing their plantings and were allowed to graze or harvest previously planted wheat as hay. However, three regions—Canada, Australia, and Western Europe—expanded their wheat areas that year and continued planting at or near the higher level in 1984-85 and 1985-86. In 1986-87, Europe and Canada continued to expand wheat area despite further reductions in U.S. wheat harvested area as a result of government farm program incentives. Thus, the U.S. 1983 acreage idling programs for wheat were partially offset as non-U.S. producers sought to take advantage of an expected tightening of world supplies. Additional U.S. efforts to reduce production since that time also have continued to be partially offset by expanded foreign plantings. While U.S. wheat area fell nearly by one-fourth as a result of the 1983 PIK program, total area of major wheat growing nations declined by only 8 percent. Unlike coarse grain, the U.S. PIK program remained in effect in both 1984-85 and 1985-86 and was modified in 1986-87 because of continuing large U.S. and world wheat supplies. Slightly less area has been idled under the program since 1983-84, so that 1986-87 U.S. world wheat area was slightly above that of 1983-84.

Longer-term trends indicate total 1986-87 wheat area harvested in major producing nations was 8 percent above a decade and a half earlier but down 4 percent from the peak 1981-82 level. U.S. wheat area harvested was 15 percent larger than 15 years earlier, while the harvested area of major non-U.S. wheat producers increased only 5.5 percent during the same period. Non-U.S. area in 1986-87, however, would have been much further above 1970-71 levels except for a 16 million hectare decline in estimated Soviet wheat area. Non-U.S. wheat producing nations that sharply expanded harvested area in the 1970s and early 1960s included Canada, Argentina, and Australia.

Figure 10. World Harvested Area Devoted to Individual Grains in Millions of Hectares, 1962-63 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 5-87, April 1987.

Rice Area Continues Long-Term Upward Trend

World rice area harvested increased slightly n 1986-87, continuing its long-term upward rend that has been in place for at least hree decades (see Figure 10). Preliminary estimates place global area at 0.5 percent ess than the record 1981-82 level but 9 percent above 15 years ago. U.S. rice area ncreased sharply in 1984-85 due to changes in farm programs, but declined slightly in 1985-86 and 1986-87, and is expected to be reduced again in 1987-88 because of government incentives to reduce plantings.

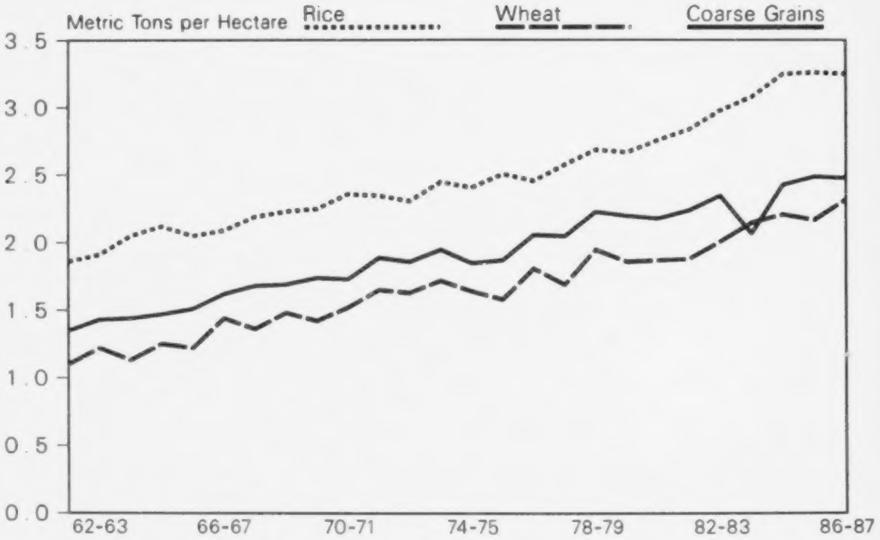
Longer-Term Prospects

World grain area harvested may trend slowly upward in the early to mid-1990s with a continuation of long-term trends in land utilization. However, for the next two to four years, global grain plantings likely will be estrained by aggressive government land-idling programs in the U.S. and depressed world grain prices, which reduce the incentives for expanded non-U.S. plantings. For he longer-term, the greatest potential for expanded plantings appears to be in South America, where additional Argentine pastureland eventually could be converted to grain production and Brazilian land clearing operations likely will continue in future years. With favorable economic conditions, some additional land also could be cleared and drained for crop production in U.S. However, such land is unlikely to be brought into crop production in significant quantities until profit margins in crop production ncrease from current depressed levels. The Soviet Union also has some additional land hat could be brought into crop production hrough irrigation or drainage. Whether or ot such land is utilized will depend on the priority placed on agriculture by the new Soviet leadership, and the cost and availability of imported grain.

Trends in Global Grain Yields

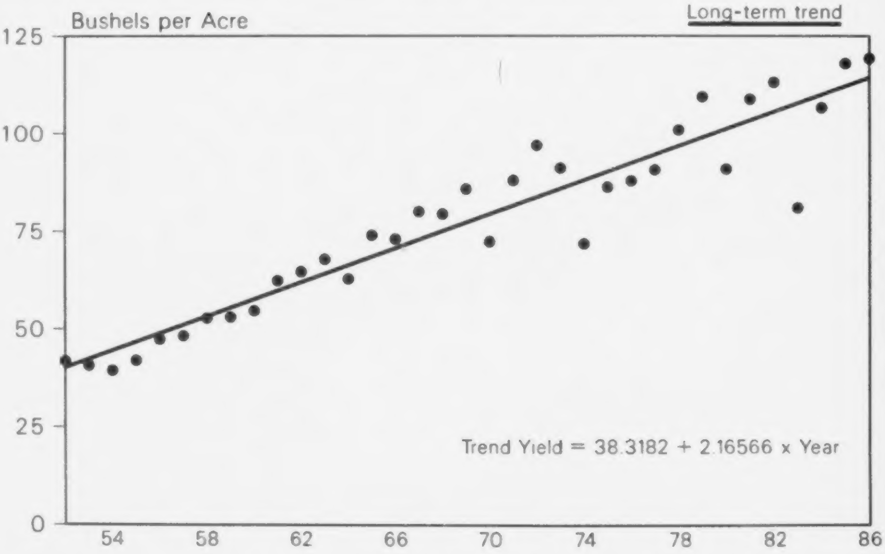
Over the past 25 years, as shown in Figure 1, world grain yields per hectare have shown an irregular long-term upward trend. During this period, global rice yields increased approximately 75 percent, along with a 111 percent increase for wheat and an 85 percent increase for coarse grains. Drought in the U.S. and South Africa was largely responsible for the sharp decrease n the world average coarse grain yields in 983-84, along with moderate yield reductions in parts of Europe. Since then, the global average coarse grain yield has esumed its upward trend with favorable weather in many areas.

Figure 11. World Grain Yields in Metric Tons per Hectare, 1961-62 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 5-87, April 1987.

Figure 12. U.S. Corn Yields in Bushels per Acre, 1952-86.



Source: U.S. Department of Agriculture, Statistical Reporting Service, Crop Reporting Board, *Crop Production 1986 Summary* (Washington, D.C.), crpr 2-1 (87), January 1987; *Field Crops* Statistical Bulletin No. 708, and various other issues.

Table 7. Wheat and Coarse Grain Area Harvested in Millions of Hectares in Selected Major Producing Countries, 1986-87 and Comparisons with Recent Years.[a]

Area or Country	Coarse Grains 1970-71	1975-76	1981-82	1983-84	1984-85	1985-86	Prelim. 1986-87	Wheat 1970-71	1975-76	1981-82	1983-84	1984-85	1985-86	Prelim. 1986-87
W. Europe	24.0	25.2	24.4	23.3	23.4	23.8	23.2	17.0	15.4	16.4	17.0	17.1	16.2	16.7
Canada	8.4	8.6	9.2	7.8	8.0	8.3	7.9	5.1	9.1	12.4	13.7	13.2	13.7	14.2
Australia	4.3	3.9	4.8	5.8	5.5	5.2	4.4	6.5[a]	8.6[a]	11.9[a]	12.9	12.1	11.7	11.3
Argentina	7.5	5.9	6.4	6.2	6.1	5.7	4.9	3.7	5.3	5.9	6.9	6.0	5.3	5.1
S. Africa	5.5	5.6	5.3	4.8	4.8	4.9	4.9	1.9[a]	1.8[a]	1.8	1.8	1.9	2.0	1.9
U.S.S.R.	43.9	58.1	58.0	61.2	59.2	58.5	58.6	65.2	62.0	59.2	50.8	51.1	50.3	48.7
Total above	93.6	107.3	108.1	109.1	107.0	106.4	103.9	99.4	102.2	107.6	103.1	101.4	99.2	97.9
U.S.	39.7	42.6	43.6	32.9	43.6	45.5	41.5	17.7	28.1	32.8	24.8	27.1	26.2	24.6
Total above	133.3	149.9	151.7	142.0	150.6	151.9	145.4	117.1	130.3	140.4	127.9	128.5	125.4	122.5

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 10-74, April 1974; FG 13-82, April 26, 1982; FG 16-75, December 22, 1975; FG 7-77, July 1977; and *World Crop Production*, WCP 4-85, April 11, 1985; WCP 4-86, April 1986; WCP 7-87, July 1987; and personal communications with officials of U.S. Department of Agriculture, Foreign Agricultural Service.

[a] Planted area.

Table 8. Comparative Yields in Metric Tons per Hectare of Selected Grain Producing Countries.

Area	Coarse Grains 1979-80	1981-82	1983-84	1984-85	1985-86	Prelim. 1986-87	Wheat 1979-80	1981-82	1983-84	1984-85	1985-86	Prelim. 1986-87
U.S.	5.71	5.71	4.17	5.46	6.04	6.09	2.30	2.32	2.65	2.61	2.52	2.31
Canada	2.63	2.83	2.68	2.74	3.02	3.29	1.64	2.00	1.94	1.61	1.77	2.24
Argentina	2.20	2.88	2.82	3.07	3.01	2.69	1.69	1.41	1.85	2.22	1.61	1.76
Brazil	1.73	1.71	1.65	1.82	1.63	1.92	0.75	1.15	1.11	1.09	1.54	1.44
Australia	1.47	1.37	1.63	1.58	1.49	1.50	1.45	1.38	1.70	1.55	1.38	1.48
World	2.17	2.20	2.05	2.43	2.48	2.48	1.85	1.87	2.14	2.21	2.18	2.32

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 4-82, April 12, 1982; WCP 3-84, March 9, 1984; WCP 4-85, April 11, 1985; WCP 4-86, April 1986; WCP 7-87, July 1987; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

Wheat and rice yields have been increasing at a slightly accelerated rate in recent years with the spread of higher-yielding hybrid varieties, increased use of fertilizer, expanded use of irrigation in some areas, and other technological innovations. With favorable weather, a continued upward trend in global average grain yields appears likely during the next several years. The upward trend appears likely to be generated by increased applications of existing yield-improving technology as well as by an ongoing gradual development of improved varieties, better management, improved cultural practices, and other technological developments.

Figure 12 shows the long-term upward trend in U.S. corn (maize) yields from 1950 through 1986. During this period, yields increased at an average rate of slightly over two bushels per acre (0.13 metric tons per hectare) per year, and the upward trend continued in the mid-1980s.[9] Figure 12, however, does show an increased year-to-year variability of U.S. corn yields in the 1970s and 1980s when compared with the previous two decades. Greater variability of yields in recent years is believed to be due to increased year-to-year fluctuations in temperatures and rainfall in the U.S. cornbelt, rather than to characteristics of current corn production technology.

Trends in Global Oilseed Area and Yields

After increasing slightly in 1984-85, global oilseed harvested area registered a small decline in the past 2 years. The decline reflects reduced soybean area planted in the U.S. as well as reduced cottonseed plantings in the U.S., India, and China, and reduced sunflowerseed plantings in U.S., Argentina, and USSR. After being restrained by drought at planting time in 1985-86, Brazilian soybean area increased slightly in 1986-87. The recent decline in U.S. soybean plantings reflects more attractive returns from production of alternative crops, and idling of cropland in a 10-year government program. Total soybean area harvested in the six leading soybean producing nations in 1986-87 fell 0.4 percent below the previous year and was about one-fourth larger than a decade earlier, as shown in Table 9. Aggregate world area harvested and the average yield per hectare of all oilseeds are shown in Figure 13, with area devoted to individual crops shown in Figure 14. Harvested area and yields both have exhibited a long-term upward trend but with downward deviations from that trend at intervals of 1 to 2 years. The year 1986-87 represents an upward deviation in both areas harvested and average yield. The increase in yields in 1986-87 reflected generally favorable weather in most major oilseed areas during the growing season.

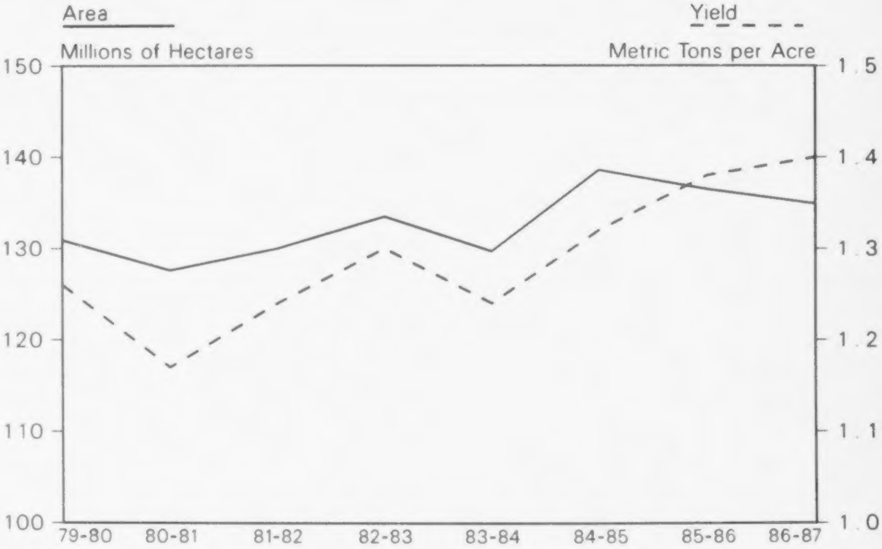
The long-term upward trend in global oilseed area reflects land clearing in Brazil; conversion of pasture land to soybeans in Argentina; shifts from small grains and pasture to soybeans in the U.S.; increased rapeseed plantings in Canada, EC, China, and India; and increased sunflowerseed plantings in Argentina. Except for the U.S., these trends appear likely to continue in most areas in the next few years as a result of depressed world prices for wheat and coarse grains, and policy actions by EC and India to encourage increased self-sufficiency in oilseed production. Growth of U.S. soybean plantings will be restrained somewhat by the long-term government land conservation reserve program designed to idle highly erodible farmland for up to 10 years.

Average world oilseed yields have been in a gradual long-term upward trend for the past several years, as shown in Figures 13, 15, and 16, and Table 10. That trend appears likely to continue in the years ahead but will be interrupted periodically by unfavorable weather in major growing regions. The upward trend reflects higher yielding varieties, improved production management, the gradual dispersion of currently available technology for weed and disease control, and improved harvesting practices to reduce field losses and quality deterioration.

Future Trends in World Soybean Production

Trends in world soybean plantings in the next few years will be influenced considerably by the growth in world demand for protein meal. With indications of a strong

Figure 13. World Yields in Metric Tons per Hectare, and Harvested Area Devoted to Major Oilseeds, 1979-80 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 4-87, April 1987

Table 9. Soybean Area Harvested in Millions of Hectares in Major Producing Countries, 1986-87 and Comparisons with Recent Years.

Area	1970-71	1975-76	1978-79	1982-83	1983-84	1984-85	1985-86	Prelim. 1986-87	Percent Change from 1970-71 to 1986-87
U.S.	16.7	20.8	23.4	28.3	25.3	26.8	24.9	24.1	+ 44
Brazil	1.3	5.8	7.8	8.2	9.3	10.1	9.5	9.4	+ 623
Argentina	0.03	0.4	1.3	2.1	2.9	3.3	3.4	3.7	+ 12,233
China	8.0	8.8	6.8	8.4	7.6	7.3	7.7	8.2	+ 3
Canada	0.1	0.2	0.2	0.4	0.4	0.4	0.4	0.4	+ 300
Paraguay	0.4	0.2	0.3	0.4	0.4	0.6	0.6	0.5	+ 25
Total	26.53	36.2	39.8	47.8	45.9	48.5	46.5	46.3	+ 74

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 6-82, May 10, 1982; WCP 4-85, April 11, 1985; WCP 5-86, May 12, 1986; WCP 7-87, July 1987; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83, April 1983; FOP 4-84, April 1984, and personal communications with officials of U.S. Department of Agriculture, Foreign Agricultural Service.

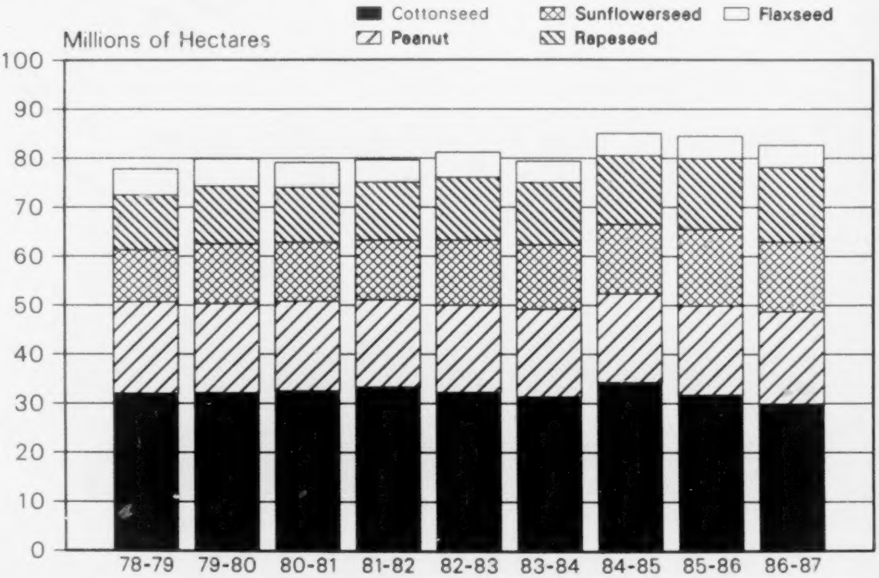
long-term upward trend in production of high oil content oilseeds such as palm products,[10] soybeans' comparative advantage will be in the protein sector. Unlike most other oilseeds, soybeans have a relatively low oil content and high protein meal yield per ton. Long-term growth in protein meal demand will depend on several key variables including global economic growth rates, the strength of the U.S. dollar, adjustments of developing nations to debt problems, and the trend in protein contents of livestock and poultry rations in the Soviet Union. Present indications are that world economic growth will trend modestly upward, the U.S. dollar will remain well below previous highs for the next few years, and increased priority will be placed on the use of protein meal in Soviet meat and poultry production. These trends should bring a gradual improvement in soybean prices relative to those of grains, and should generate a slight long-term upward trend in soybean plantings by the late 1980s or early 1990s in the U.S. along with a moderate upward trend in South America.

Figure 16 shows the long-term upward trend in U.S. soybean yields. In the last three and one-half decades, yields in the U.S. have shown an average yearly increase of 0.33 bushels per acre (0.02 metric tons per hectare). This trend appears likely to continue during the next several years as currently available technology and management practices are applied to a larger portion of the planted area. Included in this category are row spacings, pest, disease and weed control, timing of field operations, fertilization programs, tillage practices, and harvesting procedures to minimize field losses. Similar trends appear likely in application of technology; management practices; and yields in South America, China, Canada, and other soybean producing nations in the next few years, given favorable weather during the planting and growing seasons.

World Livestock and Poultry Meat Production Trends

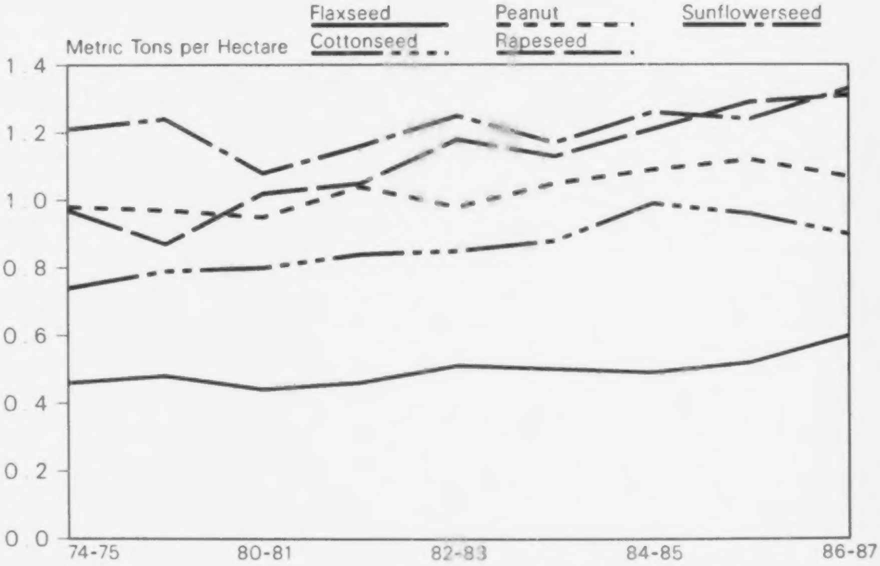
World meat production since the mid-1950s, has been sensitive to trends in consumer incomes of rapidly developing and industrialized nations, and has been an important influence on demand for coarse grains, protein meal, and other feed ingredients. Rising consumer incomes have tended to bring increased production and consumption of red meat and poultry. This trend was especially evident in rapidly developing nations in the 1960s and 1970s, but has been followed by much slower growth in

Figure 14. World Area Harvested in Millions of Hectares of Selected Oilseeds, 1978-79 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 4-87, April 1987 and various other issues.

Figure 15. World Yields in Metric Tons per Hectare of Selected Oilseeds, 1974-75 and 1980-81 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 4-87, April 1987 and various other issues.

global meat production in the 1980s. The recent slower growth rate reflects sluggish world economic growth, as well as health concerns and changing dietary trends in the U.S. and possibly other areas. Slower expansion of meat production, in turn, has been an important contributor to less rapid expansion in consumption of coarse grains and protein meal, and resulting downward pressure on prices of these commodities.

Beef Production Down, Pork Up

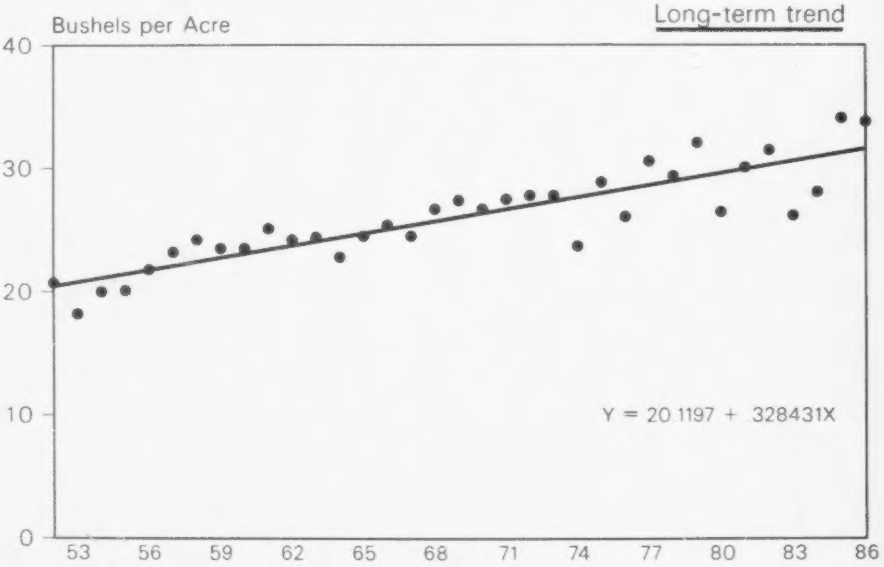
Table 11 shows pork production trends in major producing countries during the last decade. Preliminary projections place 1987 world production 1.6 percent higher than last year and 35 percent larger than the 1974-78 average. With world population expanding at about 2 percent per year, per capita production is declining slightly in 1987 but will be moderately above the level of a decade earlier. Pork production is expected to decline slightly in 1987 in Eastern Europe and non-EC countries of Western Europe but will likely be above the previous year in EC, North America, China, and USSR. In contrast to slightly reduced North and South American pork production in the last decade, pork production has shown a strong long-term upward trend in the EC, USSR, China, and other Asian nations. After a substantial reduction in East European pork production in the early 1980s in response to severe debt and financial problems, that area's production rose slightly from 1983 to 1986. Preliminary projections indicate the expansion may come to a temporary halt in 1987.

In contrast to pork, world beef production is expected to decline slightly again in 1987, with the sharpest reductions occurring in North America (see Table 12). Global production is projected to decline 0.7 percent from 1986. Production at the projected level would be only 2.5 percent above the 1974-78 average, and would leave per capita consumption 18 to 21 percent below a decade earlier. Australia, New Zealand, and USSR are expected to deviate slightly from 1987 trends of other major beef-producing countries. Production is expected to remain stable in Australia and New Zealand, and to increase by about 1 percent in USSR in 1987.

Continued Upward Trend in Global Poultry Production

In response to growing consumer incomes, consumer desire for more variety in diets, and a wider range of poultry meat products being made available by processors, global poultry meat production and consumption have increased every year since 1979. This long-term upward trend is expected to continue in 1987, but at a slightly accelerated rate, with world production projected to rise 4.6 percent above the previous year. At that level, world production will be about two-thirds larger than the 1974-78 average and per capita production will be up approximately 43 percent from the same time period. Increased production is expected in nearly all major producing areas in response to feed costs that are well below the average of recent years, as well as growing consumer demand.

Figure 16. U.S. Soybean Yields in Bushels per Acre, 1952-86.



Source: U.S. Department of Agriculture, Statistical Reporting Service, Crop Reporting Service, Crop Reporting Board, *Crop Production, 1986 Summary* (Washington, D.C.), crpr 2-1 (1987), January 1987; *Field Crops*, Statistical Bulletin No. 708, and various other issues.

Table 10. Comparative Yields in Metric Tons per Hectare of Selected Soybean Producing Countries.

Area	1975-76	1979-80	1982-83	1983-84	1984-85	1985-86	Prelim. 1986-87
U.S.	1.94	2.16	2.15	1.76	1.89	2.29	2.27
Canada	2.32	2.37	2.35	2.02	2.26	2.47	2.45
Argentina	1.60	1.80	2.09	2.41	2.06	2.18	2.05
Brazil	1.72	1.73	1.56	1.65	1.80	1.49	1.83
Australia	1.73	1.83	1.67	1.85	1.75	1.34	1.66
World	1.65	1.82	1.73	1.64	1.73	1.86	1.92

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-78, April 1978; FOP 5-83, May 1983, *Foreign Agriculture Circular, World Crop Production*, WCP 4-82, April 12, 1982; WCP 3-84, March 9, 1984; WCP 4-85, April 1985; WCP 4-86, April 1986; WCP 7-87, July 1987; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

Table 11. Pork Production in Major World Producing Areas, 1974-78 Average and 1980 through 1987 in Millions of Metric Tons.

Area	1974-78 Average	1980	1981	1983	1984	1985	Prelim. 1986	Forecast 1987
U.S.	5.9	7.5	7.2	6.9	6.7	6.7	6.4	6.4
Other N. America	1.5	1.8	1.7	2.0	1.8	1.8	1.8	1.8
S. America	1.0	1.2	1.2	1.2	0.8	0.8	0.9	1.0
EC-12	9.0	10.3	10.7	11.0	11.1	11.2	11.5	11.6
Other W. Europe	1.1	1.3	1.1	1.2	1.1	1.2	1.2	1.1
E. Europe	6.3	6.9	6.6	6.6	6.5	6.5	6.7	6.7
USSR	5.2	5.2	5.2	5.8	5.9	5.9	5.9	5.9
Asia (Exc. PRC)	2.0	2.7	2.6	2.8	3.0	3.2	3.1	3.2
Oceania	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
China (PRC)	8.7[b]	N.A.	11.9	13.2	14.4	16.5	17.0	17.6
World Total[a]	32.2	37.0	48.4	50.7	51.6	54.0	54.7	55.6

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; and FL&P 2-86, September 1986.

[a] Totals may not add due to rounding

[b] Average production for 1976-80

Table 12. Beef and Veal Production in Major World Producing Areas, 1974-78 Average and 1980 through 1987 in Millions of Metric Tons.

Area	1974-78 Average	1980	1981	1983	1984	1985	Prelim. 1986	Forecast 1987
				(Carcass Weight)				
U.S.	11.5	10.0	10.4	10.7	10.9	11.0	11.1	10.4
Other N. America	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.3
S. America	6.1	6.3	6.6	6.2	6.1	6.5	6.2	6.4
EC-12	7.1	7.5	7.5	7.4	7.9	7.8	7.7	7.8
Other W. Europe	0.6	0.7	0.6	0.6	0.7	0.7	0.7	0.7
E. Europe	2.5	2.5	2.3	2.4	2.5	2.6	2.4	2.4
USSR	6.7	6.6	6.6	7.0	7.2	7.4	7.6	7.7
S. Africa	0.5	0.6	0.5	0.7	0.7	0.6	0.6	0.6
Asia (Excl. PRC)	0.8	1.0	1.0	1.0	1.1	1.1	1.2	1.2
Oceania	2.4	2.0	1.9	1.9	1.7	1.8	1.9	1.9
Total	40.4	39.4	39.7	40.2	41.1	41.9	41.7	41.4

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; and FL&P 2-86, September 1986.

Table 13. Total Poultry Meat Production in Major World Producing Areas, 1974-78 Average and 1980 through 1987 in Millions of Metric Tons.

Area	1974-78 Average	1980	1981	1983	1984	1985	Prelim. 1986	Forecast 1987
U.S.	5.3	6.6	6.9	7.2	7.4	7.9	8.3	9.0
Other N. America	0.8	1.0	1.1	1.1	1.2	1.2	1.2	1.3
S. America	1.0	1.8	2.0	2.1	2.0	2.1	2.3	2.5
EC-12	4.2	4.8	5.2	5.3	5.2	5.3	5.4	5.5
Other W. Europe	0.1	1.2	0.2	0.2	0.2	0.2	0.2	0.2
E. Europe	1.6	1.9	2.0	1.8	1.9	1.9	2.0	2.0
Soviet Union	1.5	2.1	2.3	2.6	2.7	2.7	2.8	2.8
Africa	0.2	0.5	0.5	0.6	0.6	0.7	0.7	0.7
Japan	0.9	1.2	1.1	1.3	1.3	1.4	1.4	1.4
Other Asia and Oceania	0.4	0.7	0.8	0.8	0.8	0.9	0.9	0.9
Total	16.0	21.8	22.1	23.0	23.3	24.3	25.2	26.3

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986, and FL&P 2-86, September 1986.

U.S. Shares of World Wheat and Coarse Grain Rise Slightly

Preliminary data indicate U.S. shares of global wheat and coarse grains increased slightly in 1986-87, after several years of sharp decline. For wheat, the increase followed four consecutive years of decline, with the U.S. share of world trade dropping to a low of 26 percent in the 1985-86 trade year, and recovering to 27.6 percent in 1986-87. Coarse grain trade rose to 40.2 percent of global coarse grain exports, compared with a 34.6 percent share the previous year but was down from a 60 percent trade share as recently as 1981-82. In effect, total non-U.S. exports of wheat and coarse grain exports have increased substantially in the last five years, while U.S. exports were in a steep downward trend until 1986-87, when they turned modestly upward. The decreasing U.S. share in 1982-86 reflected large foreign grain supplies and aggressive pricing by most other exporters despite weakness of the U.S. dollar against West European and Japanese currencies. The rapid decline in the U.S. trade share was a key factor triggering major changes in U.S. farm price support policies and export programs that were implemented in mid- to late 1986.

Competition in wheat exports in the last few years has been especially strong from EC, Australia, and Canada. However, export shares obtained by EC and Australia decreased slightly in 1986-87, while Canada's share of global wheat exports increased by an estimated 8.6 percent from 1985-86. Among other major non-U.S. wheat exporters, Argentina's trade share also declined slightly in 1986-87. The EC's wheat exports are about two-fifths as large as the combined exports of Canada and Australia, and its share of world wheat trade has risen from 15.3 percent in 1981-82 to its present 17.0 percent share. However, the Australian market share has increased much more rapidly than EC, rising from 10.9 percent five years earlier to a preliminary estimate of 16.4 percent in 1986-87 (see Figure 17). The U.S. wheat export share reached a peak of approximately 50 percent in the early 1970s and has been in an irregular downward trend since that time until 1986-87. The 1986-87 U.S. share is expected to be slightly below the 31.3 percent level of 15 years earlier.

Long-Term Trend in Wheat Trade Patterns

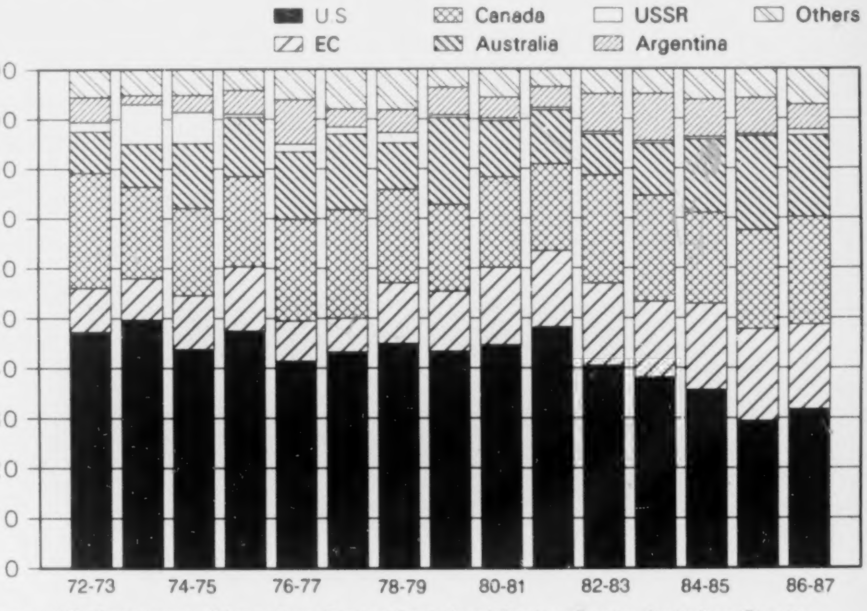
From a longer-term perspective, the U.S. share of global wheat trade increased rapidly in the early 1970s as U.S. wheat growers and the U.S. grain trade responded quickly to rising world demand. Profits from expanded world demand, as well as changing government programs brought more than a 50 percent increase in planted U.S. wheat area in only four years' time. A private enterprise economic system, combined with increased grain merchandising profits, quickly generated additional investments in U.S. grain handling and transportation capacity, thus enabling increased production to be moved into export markets. Along with these developments, a depreciation of the U.S. dollar increased the purchasing power of foreign buyers as well as the competitiveness of U.S. wheat relative to that of foreign competitors. Meanwhile, with a time lag, foreign wheat production began to rise due to increased use of fertilizer, higher yielding varieties, and increased plantings in some areas (see Figure 18). This was particularly true in EC and Argentina, which experienced steadily increased wheat export shares in the late 1970s and early 1980s. Trade shares of the other two major wheat exporters, Canada and Australia, fluctuated significantly from year to year due to more variable climatic conditions and greater variability of production.

In the next few years, the U.S. may experience a slight increase in its wheat export share due to changing U.S. trade, grain reserve, and price support policies and the lower exchange rate of the U.S. dollar relative to foreign currencies. The EC farm policies continue to be directed toward surpluses in grain production, with internal price supports that encourage production, discourage consumption, and subsidize exports. Even with increased EC wheat feeding, that region likely will continue to offer strong competition in world wheat trade. In addition, Argentina recently reduced its grain export taxes and also has a tax on idle farmland." Both developments should encourage grain production near recent levels, although depressed grain prices relative to livestock may cause some marginal land to be shifted back to pasture and livestock production in the next few years. Also, Canada has taken steps to expand its grain handling and transportation capacity, with the stated goal of sharply increasing its grain exports. These developments are being met by dramatic changes in U.S. grain price support programs, as will be noted in the policy section of this report.

Coarse Grain Export Shares

After temporarily surging upward in 1979-80, the U.S. share of global coarse grain trade dropped back to about the 60 percent level for the next four years. That was approximately the same trade share the U.S. had obtained during the 1972-73 to 1978-79 period. Then in 1984-85, the U.S. share of world coarse grain trade dropped to 55 percent from 60 percent the previous

Figure 17. Percentage Shares of World Wheat Trade by Major Exporters, July-June, 1972-73 to 1986-87.[a]



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 5-87, April 1987 and various other issues.

[a] From 1982-83 on the EC is EC-12.

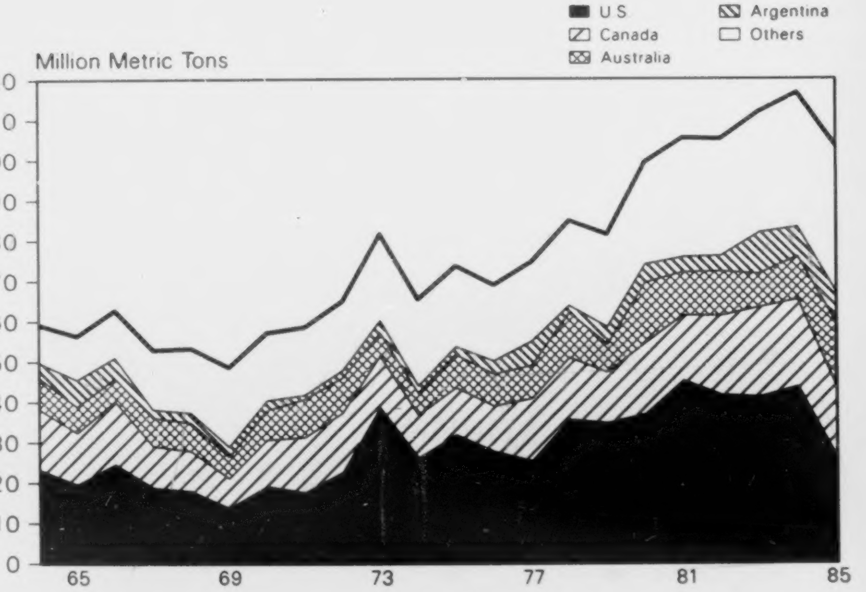
year, declining to 44 percent in 1985-86 and finally rising to about 52 percent in 1986-87. Except for 1974-75 when the U.S. corn (maize) crop was severely reduced by drought, 1985-86 represented the lowest U.S. share of global coarse grain exports since 1971-72. The declining U.S. corn and coarse grain trade shares in 1985-86 reflected increasing export shares originating in Western Europe, as well as continued exports from the People's Republic of China as a corn and sorghum exporter (including the Others category in Figure 19). An increased U.S. coarse grain export share in 1986-87 reflected sharply lower U.S. corn prices as a result of changes in American farm and trade policies.

South Africa's corn crop was struck by severe drought, in 1983 and 1984, that temporarily prevented that nation from maintaining its normal position as the world's third-ranking corn exporter. However, somewhat improved weather and increased 1985 and 1986 production allowed that nation to resume modest corn exports during the last two years. As shown in Figure 19, export shares of most other major coarse grain exporters including Canada, Australia, Thailand, and Argentina have varied considerably from year to year. These nations normally do not carry reserve grain stocks; thus weather fluctuations are a major factor behind year-to-year variations in their respective shares of world coarse grain trade. A 1984 drought sharply reduced Canada's share of world coarse grain exports in 1984-85. However, improved production allowed its trade share to rise in 1985-86 and 1986-87.

Figure 20 shows the dramatic rise in U.S. corn exports in the 1970s, while non-U.S. exports during the same period remained relatively stable. From 1979 to 1986, however, U.S. corn exports fell by 50 percent, while corn exports from all other nations as a group rose by over 80 percent. As a result, U.S. corn exports declined more sharply than the world total and brought severe financial pressures to U.S. grain producers, grain and farm supply firms, the U.S. grain transportation industry, and port elevators.

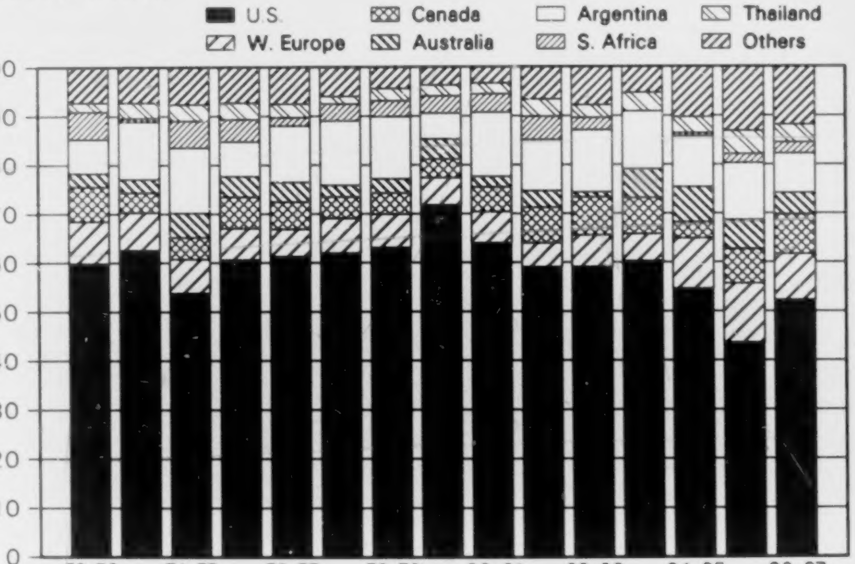
Prospects for the U.S. share of coarse grain exports in the next few years are uncertain and will depend on: (1) U.S. price support, grain reserve, and acreage control policies; (2) exchange rates of the U.S. dollar against foreign currencies; (3) Soviet grain production and consumption levels; (4) world economic growth rates; and (5) weather in major U.S. and foreign

Figure 18. World Wheat Exports by Country of Origin, Calendar Years 1964-85.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

Figure 19. Percentage Shares of World Coarse Grain Exports by Major Exporters 1972-73 to 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 5-87, April 1987 and various other issues. Marketing year data were accumulated on a July-June basis from 1970-71 through 1978-79. The USDA switched to an October-September fiscal year starting in 1979-80.

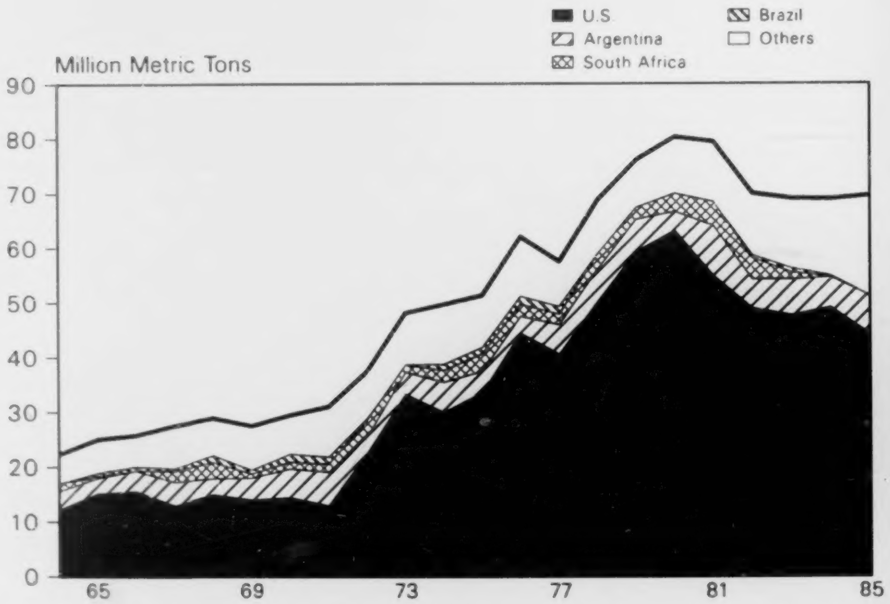
coarse grain exporting areas. At this writing, demand indicators point to slightly increased global coarse grain exports through the late 1980s and early 1990s. If this proves correct, U.S. corn and coarse grain exports likely will continue to face strong foreign competition in the next few years. However, changing U.S. farm policies should help to at least slightly increase the U.S. share of world coarse grain trade.

In the event of a sharp upturn in world trade, U.S. corn and coarse grain exports likely could be increased more rapidly than those of foreign competitors, with a resulting sharp increase in the U.S. trade share. Unlike most other coarse grain exporting nations, the U.S. has substantial excess handling and exporting capacity, land currently being idled from production, and reserve grain stocks that could quickly be used to meet expanding world demand.

Figures 19 through 21 illustrate that despite the recent lower level of world exports and a declining trade share, U.S. corn and coarse grain exports are of major importance to foreign livestock industries. U.S. exports still account for nearly two tons of corn out of every three traded in world markets and about two fifths of all coarse grains moving into international trade. These grains are used primarily for livestock and poultry feed in industrial and rapidly developing nations.

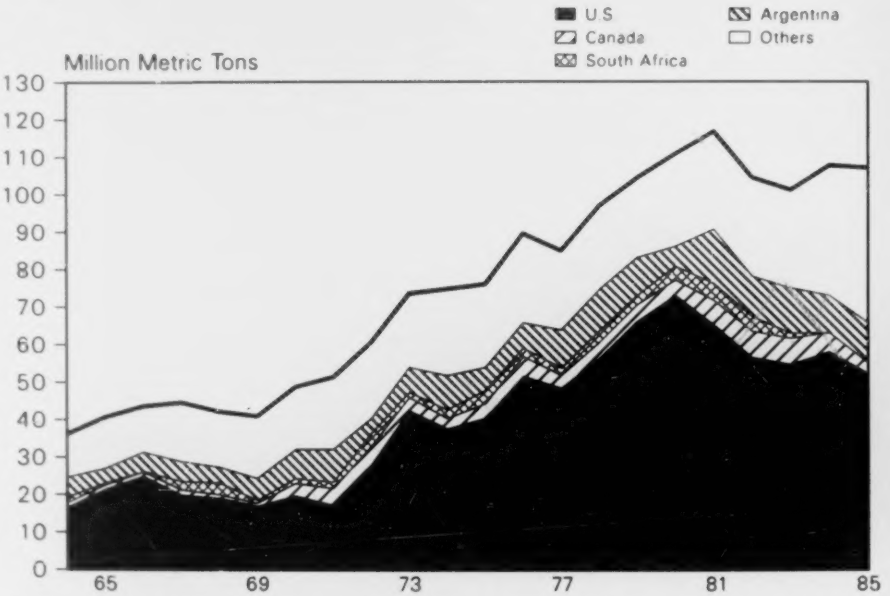
Other major coarse grain exporters include Argentina, France, Canada, and Thailand. South Africa is likely to regain its former position as the world's third-ranking corn exporter in the next few years, with a return to more normal weather in its grain belt. Despite policies intended to encourage a return to its former corn export position of the 1960s and early 1970s, Brazil remained a net corn importer through 1986 but likely will resume corn exports in 1987 because of favorable weather. Even though it has made long-term sales commitments with USSR, recent performance suggests Brazil is likely to have difficulty maintaining a net export position in corn on a consistent basis in the next few years. Restraints on Brazilian production potential include more attractive alternatives in competing crops, high costs of fertilizer and other purchased inputs, and difficulties of accumulating capital and financing production in a high-inflation economy.

Figure 20. World Corn Exports by Country of Origin, Calendar Years 1964-85.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

Figure 21. World Coarse Grain Exports by Country of Origin, Calendar years 1964-85.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

Soybean and Soybean Product Trade Shares

Soybeans

The U.S. share of global soybean trade declined substantially in 1983-84 and 1984-85, turned temporarily upward in 1985-86, but declined again in 1986-87 (see Figure 22). Preliminary data place the current U.S. share at 72 percent, down from an average of slightly over 80 percent in the 1975-76 through 1983-84 period. The recent decline in the U.S. share is the result of ncreased exports by Argentina, Brazil, and Paraguay. Other contributing factors behind he recent decline in U.S. soybean export share include the strong U.S. dollar in the 1981-87 period relative to South American currencies, and U.S. price support programs which at times have restricted the competitiveness of U.S. soybeans.

Much of the decline in U.S. and world exports in 1983-85 reflected reduced demand for soybeans and soybean meal in Western Europe. Factors contributing to that area's reduced demand included: (1) an aggressive EC program to reduce surplus dairy production; (2) increased wheat feedng, with a resulting decline in protein meal needs since wheat has a higher protein content than corn; (3) a stabilizing of other EC livestock and poultry production; and 4) large imports of U.S. corn gluten feed and meal as an alternative protein source. The dairy reduction program reduced proein feed demand in that sector of EC agriculture.[12] In addition, the U.S. dollar has at times placed U.S. soybeans and meal at a competitive disadvantage relative to foreign supplies, and debt problems have estrained demand growth in developing nations. These restraints on world soybean exports eased somewhat starting in 1985-86 and continuing through 1986-87.

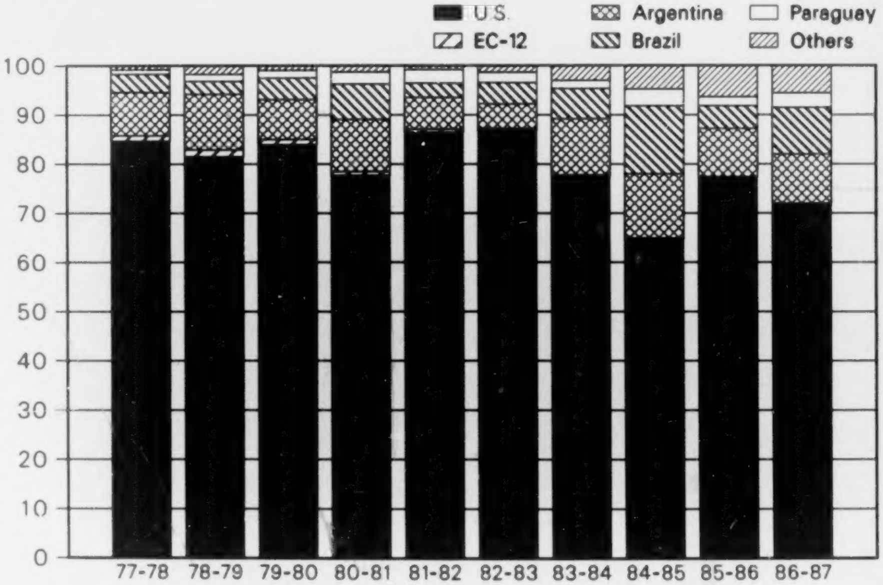
The U.S. soybean trade share in the next ew years will be influenced strongly by U.S. price-support programs and the timing of any major recovery in foreign demand for beans and meal. With relatively slow growth n world demand and no changes in price upports, the U.S. trade share can be expected to remain under pressure from South American competition. But with an ptrend in demand and/or substantially educed price support levels, U.S. producers likely would be able to expand production more quickly and more aggressively than their foreign counterparts, hus increasing the U.S. share of world rade. World soybean trade has experinced brief periods of decline in some previous years, but has shown a remarkable apacity to rebound when global economic growth resumes its upward trend. Rising onsumer incomes are closely linked with increased demand for livestock and poultry products, and consequently have a strong tendency to generate increased demand for protein meal. An additional influence on future export trends is Soviet agricultural policies, and priorities given to protein meal imports by that nation (see USSR section of this report). With the average protein content of Soviet livestock and poultry rations well below western standards, a strong case could be made for increased protein meal imports by that nation in the next several years.

Soybean Meal

The U.S. share of world soybean meal trade has declined much more sharply in recent years than that of unprocessed soybeans. The rate of decline accelerated in 1984-85, but has been partially offset by an increased U.S. export share since 1985-86. While nearly three-fourths of the soybeans traded in world markets are produced in the U.S., only about one-fourth of the soybean meal traded in world markets originates from U.S. processing plants. With strong foreign competition and sluggish global demand for protein meal, U.S. soybean meal exports in 1984-85 for the first time dropped below those of EC and Brazil (see Figure 23). Since then, U.S. exports have moved slightly above those for EC but are only about three-fourths as large as Brazil's soybean meal exports. In addition, Argentina has expanded its soybean processing capacity in recent years and additional capacity expansions are occurring there in 1987. Thus, Argentina's share of world soybean meal trade also has increased sharply in the past four years and likely will increase further in the years immediately ahead. A high percentage of the soybeans processed in EC are of U.S. origin, since climatic limitations have kept that area's domestic production at extremely low levels. Spain and Portugal account for much of the soybean meal exports in the Other category of Figure 23, although these two nations joined EC on January 1, 1986.

From a longer-term perspective, Brazil's share of world soybean meal exports has fluctuated from year to year with variations in the size of its crop. Its 1984-85 trade share was slightly below peak levels of the 1976-77 to 1977-78 period. The decline in the U.S. trade share since the late 1970s has come primarily from EC, Argentina, Spain, and Portugal. Increased trade shares by these areas reflect their governments' policies, which are designed to encourage exports of value-added products such as

Figure 22. Percentage Shares of World Soybean Trade by Major Exporters, October-September, 1977-78 to 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 5-83, May 1983; FOP 11-82, September 1982; FOP 16-81, September 1981; FOP 1-81, January 1981; FOP 10-80, May 1980; and FOP 4-87, April 1987.

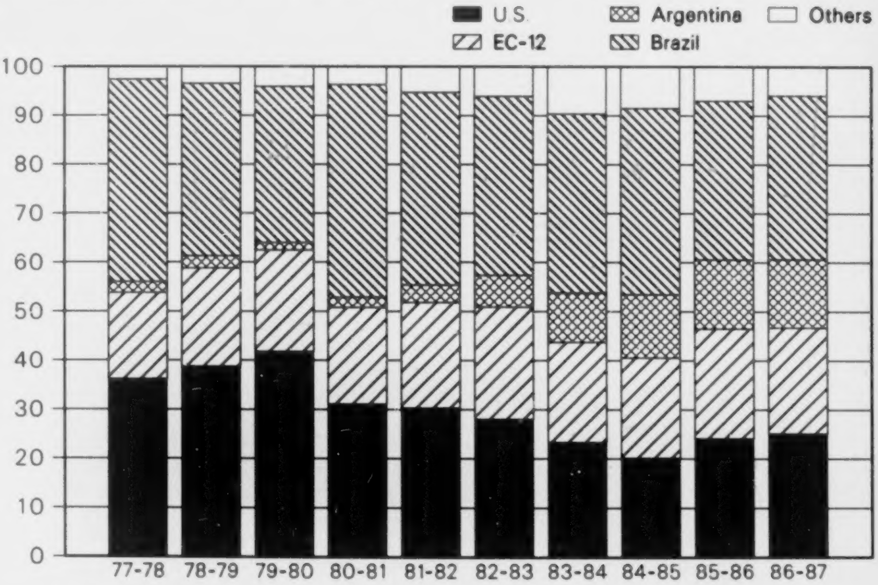
soybean meal and soybean oil. Value-added exports enable processing nations to benefit from increased domestic employment and to retain any profits resulting from processing operations. Policies used to encourage such trade patterns include larger export taxes on beans than on bean products in South America and modest import taxes on soybean oil in west European nations.

Current trade policies of these competing meal exporting nations are strongly entrenched. With excess foreign processing capacity, the U.S. soybean processing industry likely will face intense competition in its efforts to maintain or expand its share of global soybean meal trade. In contrast to U.S. soybean export shares, the excess foreign processing capacity would make it difficult for the U.S. meal trade share to rebound sharply even in case of a strong recovery in world soybean meal demand.

Soybean Oil

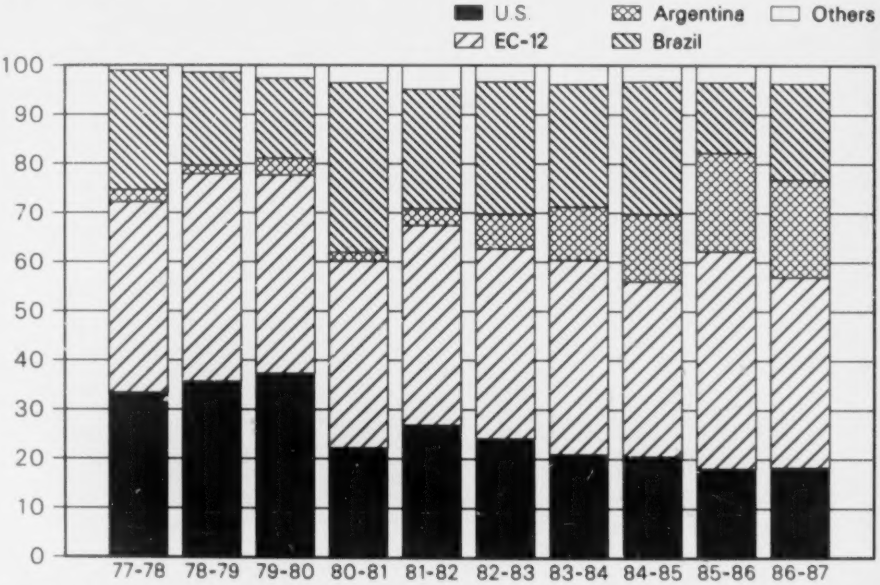
The U.S. share of global soybean oil exports has followed a pattern similar to that for soybean meal, except that the soybean oil share held approximately constant in 1985-86 and 1986-87. U.S. soybean meal's share of world trade, as noted in the preceding section, declined moderately in 1984-85 but recovered slightly in the next two years. The U.S. now ranks fourth in soybean oil exports, behind Brazil, Argentina, and EC (see Figure 24). Argentina's share has been increasing rapidly since the early 1980s and may well continue to trend irregularly upward in the remainder of the decade as that nation's soybean production and processing capacity expand. Competition from EC and Brazilian processing industries will depend heavily on trade policies of those areas as well as trends in Brazilian soybean production and domestic soybean oil consumption. With no major changes in trade policies, U.S. soybean oil exports appear likely to face continued strong competition from the nations shown in Figure 24 in the years ahead.

Figure 23. Percentage Shares of World Soybean Meal Trade by Major Exporters, October-September, 1977-78 to 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 5-83, May 1983; FOP 11-82, September 1982; FOP 16-81, September 1981; FOP 1-81, January 1981; FOP 10-80, May 1980; FOP 5-86, May 1986; and FOP 4-87, April 1987.

Figure 24. Percentage Shares of World Soybean Oil Trade by Major Exporters, October-September, 1977-78 to 1986-87.[a]



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), FOP 11-82, September 1982; FOP 6-83, June 1983; FOP 6-84, June 1984; FOP 6-85, June 1985; FOP 6-86, June 1986; and FOP 4-87, April 1987.

[a]The EC in 1977 is EC-10.

Trade Shares in Livestock Product Exports

Beef and Veal Exports

The U.S. share of world beef and veal exports has increased slightly over the past 15 years and a small decrease is expected in 1987. However, U.S. beef and veal exports still represent less than 5 percent of world trade and are dwarfed by much larger exports from Australia, New Zealand, Brazil, and EC. One reason for the limited U.S. beef exports is that most of the world's beef trade is in lower quality products rather than the highly finished beef typically produced in the United States. The U.S. beef export share was 3.4 percent of world trade in 1984 and is expected to reach about 4.1 percent in 1987. As shown in Figure 25, that compares with a U.S. trade share of only 0.6 percent in 1970.

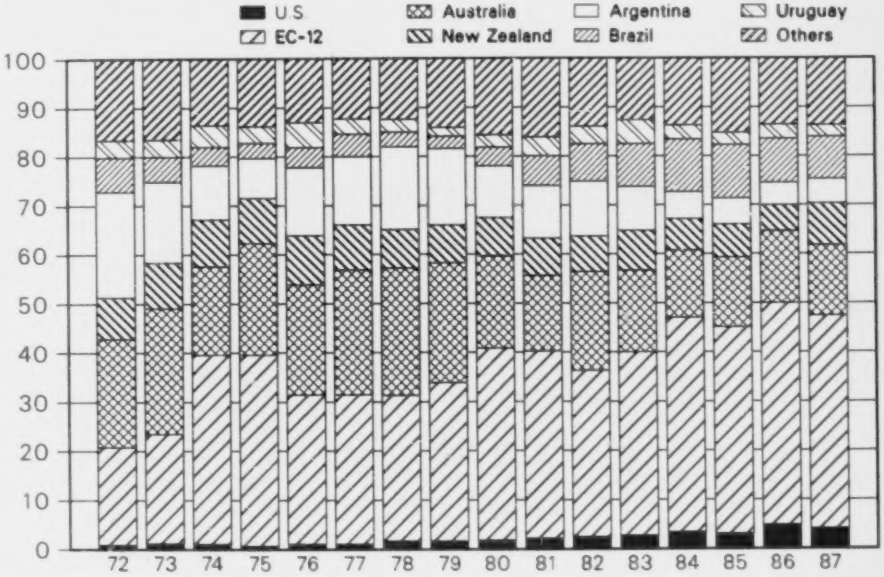
Major non-U.S. exporters of beef in order of size include EC, Australia, Brazil, New Zealand, Argentina, and Uruguay. The substantial long-term growth in EC's share of world beef exports since 1970 has come largely at the expense of Australia, Argentina, and New Zealand. Sizable yearly fluctuations in exports from Australia and Argentina reflect an unstable climate in those areas, with herd liquidation tending to increase supplies and depress prices during drought years. Conversely, when pasture and range conditions are favorable, producers tend to retain animals to rebuild herds, with a resulting decline in beef supplies.

Australia was in a herd expansion phase from late 1983 through 1985, after experiencing severe drought and herd liquidations in the early 1980s. Argentina's declining export share at least partially reflects that country's increased emphasis on wheat, corn, sorghum, sunflowerseed, and soybean exports as sources of foreign exchange earnings, and a resulting decrease in the amount of land devoted to pasture.

Pork Export Shares

The EC also is the world's largest pork exporting area as shown in Figure 26. If intra-EC exports are included, its exports since 1970 have accounted for 61 to 64 percent of world pork trade. However, its share of global exports has trended slightly downward since the mid-1970s. During the same period, Canadian, Chinese, and East European export shares have increased slightly. The U.S. pork export shares reached a peak in 1976 and have been declining gradually since, partly because of strong European and Canadian competition. The U.S. share of world pork exports is expected to be approximately 1.4 percent

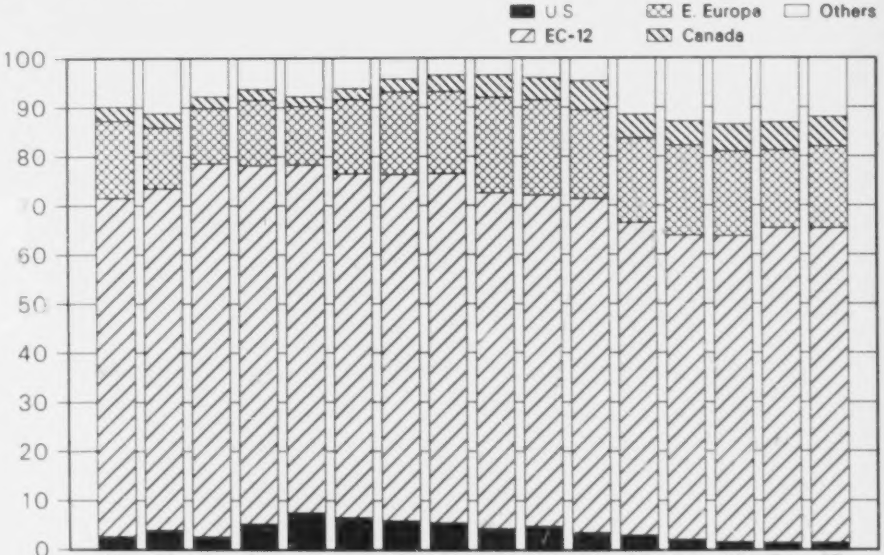
Figure 25. Percentage Shares of World Beef and Veal Trade by Major Exporters, 1972-87 Calendar Years.[a]



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation* (Washington, D.C.), FL&P 2-83, May 1983; FL&P 1-84, April 1984; and FL&P 2-86, September 1986. *Foreign Agriculture Circular, Livestock and Meat* (Washington, D.C.), FLM 2-81, February 1981; FLM 2-80, February 1980; FLM 9-78 and 10-78, September 1978.

[a] From 1983 on, the EC is EC-12.

Figure 26. Percentage Shares of World Pork Trade by Major Exporters, 1972-87 Calendar Years.



Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation* (Washington, D.C.), FL&P 1-82, April 1982; FL&P 2-83, May 1983; FL&P 1-84, April 1984; FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; *Foreign Agriculture Circular, Livestock and Meat* (Washington, D.C.), FLM 2-81, February 1981; FLM 2-80, February 1980; FLM 9-78 and 10-78, September 1978.

in 1987, less than one-third as large as its record 1976 trade share. While some growth in U.S. pork exports is possible in future years if the U.S. dollar maintains a realistic level in foreign currency markets, U.S. producers continue to face sizable import barriers in other countries and strong competition from other pork exporting nations.

Poultry Meat Export Shares

As shown in Table 14, the U.S. share of world poultry meat exports was in a downward trend from 1981 through 1985. However, poultry meat exports from the U.S. increased moderately in 1986, accounting for approximately 16 percent of the world total but down from 20 percent in 1980. The U.S. poultry meat export share is expected to remain approximately constant in 1987. World poultry meat exports grew rapidly in the late 1970s and early 1980s, then trended slightly downward in 1984, as importing nations struggled with slower rates of economic growth and debt burdens. Since 1985, however, global exports have again resumed a slight upward trend.

The declining U.S. trade share was influenced by the strong U.S. dollar in the 1982-84 period and a resulting increase in cost to foreign buyers for purchases of U.S. poultry. In addition, debt pressures and high interest costs have encouraged Brazil and Eastern Europe to place greater emphasis on value-added exports as a means of earning foreign exchange. In the U.S., a strong shift in dietary patterns from red meat to poultry meat may have contributed somewhat to the decline in its export share by reducing the availability of poultry meat for export. The shift reflects consumer concern over cholesterol in red meat as a contributor to heart disease, and the increased variety of convenience-type poultry products that can be prepared quickly for consumption. In the next few years, these same forces likely will continue to influence patterns of world trade in poultry meat.

Table 14. World Poultry Meat Exports by Major Exporters, 1974-78 Average and 1979 through 1987 in Thousands of Metric Tons.

Area	1974-78 Average	1979	1981	1983	1984	1985	Prelim. 1986	Proj. 1987
U.S.	148	228	375	225	209	211	257	256
Brazil	23	81	295	289	281	274	251	251
EC-12	476	609	833	839	774	775	758	769
E. Europe	173	196	289	297	304	302	329	347
World Total	853	1,156	1,836	1,684	1,602	1,608	1,648	1,684

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; and FL&P 2-86, September 1986.

Developments in Soviet Agriculture and U.S. Trade Relationships

With large year-to-year fluctuations in its grain production and imports (see Figure 27), the Soviet Union is a major influence on the volume of grain traded in world markets and has considerable impact on world grain prices. For example, approximately one-fourth of the world grain trade and one-third of all U.S. corn exports in 1984-85 were accounted for by Soviet imports. But the next year, its imports accounted for only 17 percent of global grain trade and about one-fifth of all U.S. exports. Its significance as a price influencing factor is caused not only by the size and variability of its imports, but also by its centralized grain purchasing system. Import decisions in USSR are made by a small group of government officials who can contract for the nation's entire yearly grain import needs in a very short time, if they wish to do so. This centralized purchasing system creates the potential for an ever-present element of surprise in Soviet buying patterns.

The USSR's initial entry into world grain markets in the early 1970s as a large and continuous grain importer was a classic example of this surprise element, with Soviet buyers dealing with several large grain firms and failing to disclose the total size of their import needs to any one firm or to U.S. Department of Agriculture officials in charge of the wheat export subsidy program. Since that time, grain merchandisers throughout the world have continuously watched Soviet weather, political developments, and other factors that might reveal likely purchasing patterns. The importance of this potential surprise element stands out when the USSR purchasing system is contrasted with that of Japan, another large grain importer. Japan's private enterprise system spreads purchasing decisions over a large number of individual decision makers, and the element of potential surprise is much less significant than with the Soviet Union. In addition, Japan's grain import levels are relatively stable from year to year. Consequently, only very minor world grain price reactions follow Japanese purchase announcements.

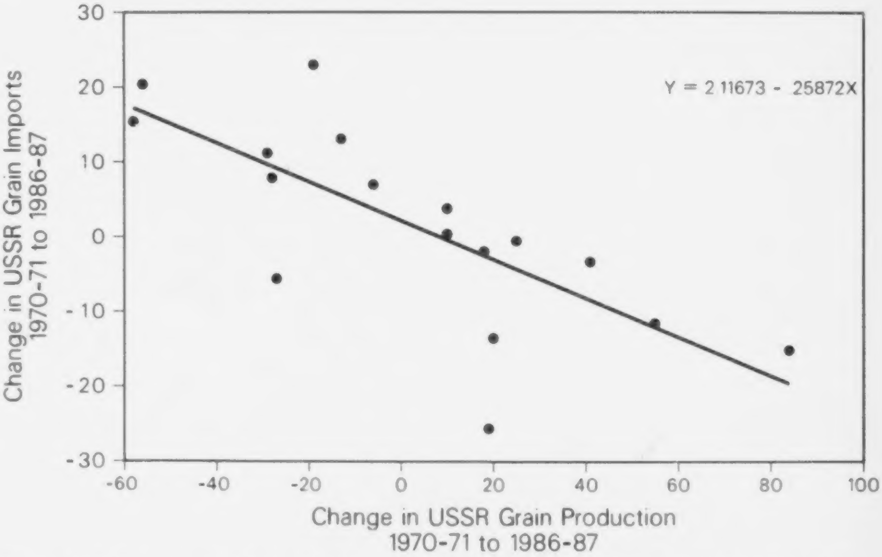
1986-87 Soviet Grain Imports Near Previous Year but Well Below Record

In 1984, a sizable part of the Soviet grain belt was struck by drought. Grain production dropped to the lowest level in three years and fell 10 percent below the average of the previous nine years. Production that year also was the sixth consecutive year in which Soviet grain production fell sharply below the officially planned level. With a series of poor crops, record or near-record livestock and poultry production, and low grain carryover stocks, Soviet grain imports in 1984-85 jumped to a record 55 million metric tons (July-June trade year), up 23 million metric tons or 72 percent from a year earlier. Previous record grain imports by the Soviet Union were 46 million metric tons in 1981-82, following an extremely low 151 million metric ton grain harvest. In 1982-83, with moderately increased crop production, Soviet imports declined by 28 percent.

In 1985 and 1986, Soviet grain production recovered moderately from the previous low levels because of improved weather during the growing season and improved management systems. That triggered yet another large fluctuation in Soviet trade, with preliminary estimates of its total 1985-86 grain imports dropping 46.5 percent or 25.6 million metric tons below the previous year. Its imports in 1986-87 are estimated to be about 2 percent above a year earlier. Decreased Soviet imports were the main reason for a decline in world grain trade in 1985-86, with its wheat and coarse grain imports estimated to have fallen by 44 and 49 percent respectively that year.

Early indications are that Soviet grain production may decline in 1987 and its imports may rise in the 1987-88 trade year. Winter wheat production, which normally accounts for approximately one-third of the country's total grain harvest, reportedly experienced heavier-than-normal winter kill. Its spring 1987 planting season also was colder than normal and caused plantings to be delayed two to three weeks later than usual. Also adding uncertainty to 1987-88 Soviet import requirements is the availability of foreign exchange for grain purchases. Soviet foreign exchange availability for grain imports appears to have been reduced substantially by the large decline in world petroleum prices in late 1985 and early 1986. Oil and gas exports are a major source of revenue for the Soviet Union.[13] The resulting decreased availability of foreign exchange may require some reordering of Soviet priorities on industrial growth, defense, and goals regarding increased per capita consumption of livestock and poultry products.

Figure 27. Relationship Between Changes in USSR Grain Production and Imports, 1970-71 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 25-76, October 7, 1976; FG 4-83, February 15, 1983; FG 7-85, May 1985; SG 4-87, April 1987.

Longer-Term Grain Production Prospects

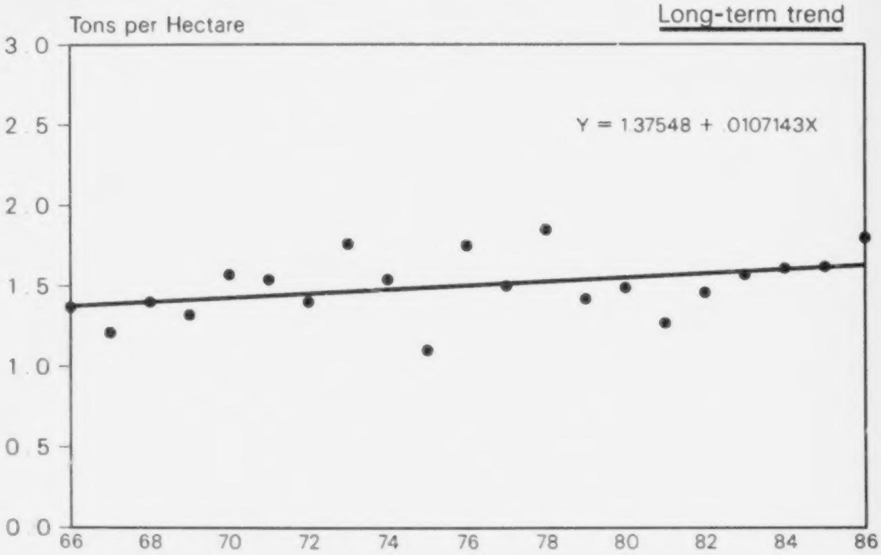
Figure 28 shows little upward trend in Soviet grain yields since the early 1970s and large year-to-year variability of yields. Future trends in Soviet grain imports will depend heavily on the success of that nation in reducing its annual yield variability and in overcoming an apparent inability to improve the productivity of its grain sector. Factors contributing to its two problems are complex and include climatic limitations from a grain belt that lies largely on a latitude similar to that of the Canadian prairie provinces. The resulting climate includes a short growing season and substantial risk of drought, as well as periodic problems from excessive rain or snow during the harvesting and winter wheat planting seasons.

Along with climatic limitations, Soviet agriculture faces serious coordination problems from its state-controlled agricultural system. Such problems are evident from reports of a chronic lack of spare parts and disabled machinery during key field work periods; inadequate crop drying, storage, and transportation equipment at harvest; reports of harvesting and planting delays as farm workers wait for instructions on the individual day's activities; lack of the proper type and quantities of fertilizer at the time it is needed; and similar problems with other inputs. With a short growing season, optimum timing and coordination of all operations is essential for an efficient crop production sector.

While substantial time likely will be required to achieve improved coordination in the Soviet crop sector, the nation now appears to be shifting in that direction. The top Soviet leadership position has been transferred to a relatively young person trained in agronomy and experienced in USSR agriculture. Massive Soviet grain and oilseed imports have absorbed foreign exchange that otherwise could have been used to improve industrial output, so a strong incentive exists for USSR to deal with lagging productivity in crop production.

According to a recent U.S. Department of Agriculture publication, the current Soviet leader has emphasized streamlining and optimizing the current agricultural system, rather than making radical changes in the system itself. A move reportedly is under way to improve labor productivity through a collective contract system where worker renumeration is linked more closely with output.[14]

Figure 28. Trend in USSR Grain Yields in Metric Tons per Hectare, 1966-86.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 25-76, October 7, 1976; FG 4-83, February 15, 1983; FG 7-85, May 1985; SG 4-87, April 1987.

Table 15. Soviet Grain, Soybean, and Soybean Meal Importing Patterns in Millions of Metric Tons, 1975-76 through 1986-87.

	1975-76	1976-77	1977-78	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	Proj. 1986-87
Wheat Imports[a]	10.1	4.6	6.6	16.0	20.3	20.8	20.5	28.1	15.7	17.0
Coarse Grain Imports[a]	15.6	5.7	11.7	18.0	26.0	12.5	11.5	26.9	13.7	13.0
Total Imports, Wheat and Coarse Grains	25.7	10.3	18.3	34.0	46.3	33.3	32.0	55.0	29.4	30.0
Percentage from U.S. Origin[b]	54%	72%	78%	24%	34%	20%	44%	28%	24%	30%
Soybean Imports	1.7	1.5	0.9	1.4	1.5	1.1	1.0	0.9	1.9	1.0
Percentage from U.S. Origin[b]	18%	62%	93%	0%	40%	40%	50%	0%	79%	0.0
Soybean Meal Imports	0.0	0.1	0.0	1.0	1.1	2.8	0.8	0.6	0.7	1.7
Percentage from U.S. Origin[b]	0%	100%	0%	0%	0%	0%	0%	0%	0%	29.0

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* FG 23-82, July 16, 1982; FG 10-83, April 12, 1983; FG 4-87, April 1987; SG 7-87, July 1987. *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-81, March 1981; FOP 9-82, July 1982; FOP 4-83, April 1983; FOP 6-84, June 1984; FOP 4-87, April 1987. U.S. Department of Agriculture, Agricultural Marketing Service (Independence, Mo.) *Grain Market News and Feed*, various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *U.S. Export Sales*, June 4, 1982, various issues.

[a] July-June trade years

[b] Imports from U.S. origin are on October-September marketing years

Other Soviet policies aimed at improving crop production include large investments called for in a long-term program to drain approximately 20 million hectares of potential cropland by the year 2,000 and to extend irrigation to 30 to 32 million hectares.[15] Available investment funds and costs of the projects will determine whether these goals are attained. Other investment plans call for expanded grain storage and handling facilities to reduce spoilage losses and expanded production of fertilizer and farm machinery.[16] Soviet grain and oilseed yields likely will trend upward in the years ahead. However, the performance record of the last 15 years suggests that changes are likely to be gradual, and that the USSR will likely continue its large and variable pattern of grain imports for the next several years.

Oilseed Prospects

Prospects for Soviet oilseed and/or oilseed products are less clear than those for grain. Official plans call for sharp increases in oilseed production but so far little progress has been made in that direction (see Table 16). Soviet livestock rations contain extremely low protein content by western standards. Increased protein meal imports could enable Soviet agriculture to more efficiently use limited grain supplies and also could improve productivity of its livestock and poultry sector. Accordingly, some Western analysts of Soviet agriculture believe the current leadership may place increased priority on oilseed and/or protein meal imports in the years immediately ahead.

Livestock Sector

In the USSR livestock sector, aggregate Soviet livestock numbers have expanded slowly since 1985, with preliminary estimates of 1987 total beef, pork, and poultry meat production reaching a record 16.4 million metric tons, 0.9 percent above a year earlier. Milk and egg production also expanded at similar rates. Use of grain in livestock and poultry feed in the USSR has fluctuated in a relatively narrow range in recent years, despite increased meat, egg, and milk production.[17] Thus, feed conversion efficiency of the Soviet livestock sector appears to be trending upward. Further increases in feed conversion efficiency appear likely in the years ahead through animal breeding and genetics, improved animal health and nutrition, better management, and related developments.

U.S.-USSR Grain Agreement

The current U.S.-USSR Grain Trade Agreement went into effect in October 1983 and will have a duration of five years ending on September 30, 1988. It requires the United States to make available and the USSR to purchase a combined minimum of 9 million tons annually of U.S. corn and wheat, up from 6 million tons in the prior agreement. The current agreement also allows 0.5 million metric tons of soybeans or soybean meal to be substituted for 1 million tons of grain, at the discretion of USSR, in meeting the minimum purchase commitment. In addition, the agreement permits USSR to purchase a combined maximum of up to 12 million tons of U.S. wheat and corn without prior consultation with the U.S. government. With consultation, additional purchases beyond the 12 million ton limit may be permitted. In the 1984-85 trade year, the U.S. administration offered to make as much as 27 million tons of U.S. corn and wheat available to USSR if it desired to purchase that quantity. However, actual Soviet purchases of U.S. grain were only about two-thirds that amount.

The long-term agreement is a continuation of the U.S. trade policy with USSR initiated in the mid-1970s partly in an effort to bring greater stability in Soviet purchasing patterns and to reduce the element of potential surprise in its purchases. In nine years of such agreements, both sides continued to honor their minimum commitments for corn and wheat until 1984-85 and 1985-86, when the USSR failed to meet its minimum U.S. wheat purchase obligations. Soviet officials gave as their reason for failing to meet wheat commitments the fact that U.S. wheat was priced above that of other wheat exporters, and the U.S. had refused to grant USSR adequate price concessions through its Export Payment-in-Kind program that has been offered selectively to some wheat importers. In May 1987, the U.S. announced details of a wheat Export Payment-in-Kind transaction covering 4 million metric tons of 1986 and 1987 crop U.S. wheat, to be shipped between May and September, 1987. With this transaction, USSR will again honor its minimum wheat purchase commitments in 1986-87. Despite past problems with wheat sales to the Soviets, it is highly likely that USSR will continue as a large importer of U.S. corn, at least through the October 1987-September 1988 trade year and probably beyond that period. Alternative non-U.S. supplies of corn are more limited than those for wheat and will likely encourage the Soviet Union to honor its long-term corn purchase commitments with the U.S. However, its total purchases of U.S. grain likely will continue to vary from year to year, depending on the size of the Soviet grain harvest, the availability of foreign exchange in USSR, and political relationships between the two nations. At this writing, it is uncertain whether the long-term U.S.-USSR grain agreement will be renewed beyond 1987-88.

Table 16. Soviet Oilseed Production in Millions of Metric Tons, 1972-73 through 1987-88.

	Soybeans	Cottonseed	Sunflower
Projected			
1987-88	.70	4.76	5.00
Preliminary			
1986-87	.70	4.61	5.26
1985-86	.46	4.90	5.23
1984-85	.47	4.74	4.53
1983-84	.56	4.82	5.06
1982-83	.50	5.09	5.34
1981-82	.45	5.28	4.65
1980-81	.53	5.08	4.62
1979-80	.40	4.14	5.41
1978-79	.63	4.67	5.33
1977-78	.54	4.69	5.90
1976-77	.48	4.51	5.28
1975-76	.78	4.81	4.99
1974-75	.36	4.53	6.78
1973-74	.42	4.36	7.39
1972-73	.26	4.09	5.05

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-84, April 1984; FOP 2-84, February 1984; FOP 11-83, November 1983; FOP 9-83, September 1983; FOP 13-82, November 1982; *World Crop Production*, WCP 4-85, April 1985; WCP 5-86, May 12, 1986; WCP 7-87, July 1987.

Financial Developments Affecting U.S. and World Agricultural Trade

After accelerating sharply in 1984, U.S. economic growth slowed substantially in 1986 and early 1987, and is expected to continue expanding at only a modest rate through early 1988. Since the U.S. has been leading the world economy out of the recession of the early 1980s, slower U.S. economic growth is expected to be a tempering influence on the world economy in the next 6 to 12 months. However, growth rates will continue to differ substantially from one area to another. Continued moderate economic growth is expected in Pacific Rim nations including the Republic of Korea, Japan, Taiwan, Hong Kong, Singapore, and Malaysia. Economies of these countries are expected to be supported by continued strong exports to the U.S., and moderate energy costs. However, Japanese economic growth may be restrained somewhat by a sharp downward plunge of the U.S. dollar relative to the yen. The resulting increase in cost of items imported into the U.S. from Japan may slow the growth in demand for Japanese industrial products. Recent trends suggest West European economies may continue to experience a relatively slow economic expansion during the next 6 to 12 months, along with slow real economic growth in a number of heavily indebted developing nations. In general, these trends point to a continuation of the recent pattern of relatively slow growth of U.S. and world export demand for agricultural products for at least the next one to two years.[18]

Key Problem Areas

Global economic prospects for the years immediately ahead are closely related to three problem areas: (1) heavy indebtedness of developing nations as well as the U.S. government and many private firms and individuals in developed economies, with accompanying large financial needs for debt servicing; (2) the unstable exchange rate of the U.S. dollar; and (3) the level of real interest rates (nominal interest minus inflation rate), which affect debt-servicing costs, economic growth, the availability of consumer funds for food purchases, and agricultural production, processing, storage, and marketing costs.[19] These three areas are closely interrelated and stem at least partly from U.S. monetary and fiscal policies. The U.S. fiscal policy with its large federal budget deficit is highly stimulative to the U.S. economy. As a result, a relatively restrictive monetary policy has been required to control U.S. inflation and restrain the otherwise highly expansionary tendency of government spending and taxation policies. These diverging policies have created a strong U.S. government demand for credit, with resulting high domestic real interest rates, even though U.S. real interest rates have declined considerably in the last two years.

Since international investment capital moves freely and quickly from one country to another in search of maximum returns, capital movement into the U.S. has been heavy. The strong foreign demand for U.S. dollars for investment purposes has helped to support the U.S. dollar to some extent, although its value against major West European and Pacific Rim currencies declined sharply from early 1985 to early 1987. These foreign capital flows into the United States have assisted in financing the U.S. budget deficit. In the early 1980s, the strong dollar reduced the cost of foreign products imported into the U.S. and retarded its inflation rate.

Other nations also have adopted more restrictive monetary policies in the past seven years than in the 1970s, in an effort to retard capital outflows to the U.S. Resulting relatively high real interest rates, along with movement of investment capital to the U.S., have tended to hold non-U.S. economic growth well below the levels of the 1970s. At the same time, these interest rates have pushed inflation rates in most industrial nations well below the levels of the previous decade.

From time to time over the past seven years, the interrelated problems of debt and high interest rates have caused uneasiness about the health of the U.S. and world banking systems. Concern has developed because of heavy involvement of some leading institutions in loans to developing nations that are experiencing difficulty meeting debt-servicing requirements. The system could be placed under severe pressure in case of widespread defaults on such loans. Other concerns about the banking system from time to time stem from debt burdens of private U.S. firms, as well as investment losses stemming from volatile interest rates and/or currency exchange rates. However, developing nations appear to be making gradual progress in reordering their economies to meet debt-servicing requirements, and concern over the international banking system appears to be somewhat diminished at this writing.

Debt Burdens of Developing Nations

Recent estimates of outstanding external debt in several developing nations are shown in Table 17. The three most heavily indebted developing nations are Brazil, Mexico, and Argentina, along with substantial debt burdens in Eastern Europe and several oil exporting nations. In Latin America, adjustments to debt burdens have generally involved a four-dimensional approach: (1) reduced government spending, (2) restructuring debts to lengthen repayment periods, (3) reducing nonessential imports, and (4) taking steps to increase exports. After experiencing severely reduced real economic output in the early 1980s, many Latin American countries are

Table 17. Estimated Outstanding Debt of Selected Nations in Billions of U.S. Dollars in 1984.

	Total External Debt
S. Korea	35.0[b]
Poland	27.0[d]
Indonesia[a]	21.9[b]
Philippines	28.0[c]
Nigeria[a]	20.9[d]
USSR[a]	28.7[c]
Iran[a]	7.2[c]
Iraq[a]	5.3[c]
Israel	14.6[c]
Argentina	47.0[d]
Bolivia	3.2
Brazil	100.0[d]
Colombia	10.8
Costa Rica	4.1
Chile	18.4
Dominican Republic	2.9
Ecuador	6.9
El Salvador	2.3
Guatemala	1.9
Haiti	.6
Honduras	2.3
Mexico[a]	100.0[d]
Nicaragua	3.9
Panama	3.6
Paraguay	1.6
Peru	14.0[d]
Uruguay	4.7
Venezuela[a]	23.0[d]

Sources: *Wall Street Journal* (Chicago, Illinois), various issues, and *Journal of Commerce* (New York, New York), May 6, 1985, January 6, 1986, February 14, 1986, May 6, 1986, and June 9, 1986.

[a] Oil exporting nations.
[b] 1982 debt levels.
[c] 1983 debt levels.
[d] 1986 debt levels.

ow beginning to experience slightly ositive real economic growth.[20] At the ame time, however, exports of such coun- ies as Brazil and Argentina are creating ncreased competition for U.S. agricultural xports. Heavily indebted nations are under trong pressure to restrain imports and ncrease exports to meet debt-serving osts. These pressures have been slightly educed by lower interest rates and a esulting decline in debt-servicing costs. Recent weakness of the dollar and decreased costs for imported energy and ther raw materials also have helped to ease debt burdens of oil-importing develop- ng nations.

However, the sharp decline in world pe- roleum prices appears likely to remain a major restraint on the economic growth of Mexico, Venezuela, Nigeria, and other oil exporting developing nations. Relatively low energy export prices may worsen debt-servicing problems of these countries while relieving debt problems of oil importing nations.

Exchange Rate Developments

From mid-September 1985 to mid-April 1987, the exchange rate of the U.S. dollar declined by approximately 41 in terms of the Japanese yen and by 37 and 32 percent respectively against the West German mark and French franc. The lower exchange rate reflected several developments including easing of U.S. monetary policy, lower petroleum prices, which were expected to benefit West European importers and Japan more than the U.S. because of greater dependence of those nations on oil imports, and coordinated monetary actions by a group of seven industrial nations. The group of seven included the U.S., United Kingdom, France, West Germany, Canada, Italy, and Japan. These nations agreed to coordinate monetary and fiscal policies in ways that would allow the U.S. dollar to decline in value relative to currencies of major industrial nations. Coordinated action by the group appears to have been triggered at least partly by strong pressures for trade protectionism in the U.S. Congress, to protect U.S. industries from low-cost imported products. The strong dollar during the 1981 to early 1985 period substantially reduced the cost of many products imported into the U.S., and was a contributor to the large and growing U.S. trade deficit. However, substantial time lags are required for the recent weaker U.S. dollar to have a major positive impact on the nation's trade balance.

Through mid-1987, U.S. agricultural exports, except for soybeans, showed little or no positive response to the weaker dollar. A decline in the exchange rate of the U.S. dollar tends to lower the cost of U.S. exports in foreign markets, and theoretically should encourage increased exports. However, grain prices to final users in most of Western Europe, USSR, and Eastern Europe and wheat prices in Japan are largely insulated from exchange rate fluctuations.[21] Thus, the weaker dollar should not be expected to expand the demand for U.S. grain in these areas. In addition, U.S. grain exports continued to face strong competition in 1986-87 from record foreign supplies and restrained demand resulting from a sluggish world livestock economy. Unlike wheat and corn (maize) prices, soybean and soybean meal prices to most foreign users are relatively free of artificial restrictions and are able to reflect exchange rate changes within a relatively short time. Thus, the weaker dollar may have contributed to the substantial price increase from September 1985 to January 1987. Prices also benefitted from sharply reduced 1986 production in Brazil.

An additional factor limiting the response of U.S. grain exports to the declining dollar exchange rate against West European and Japanese currencies is the continued strong dollar relative to other grain exporters and many developing nations. For example, while the U.S. dollar fell about 41 percent relative to the yen from mid-September 1985 to mid-April 1987, it declined only 4 percent against the Canadian currency, 6 percent against the Australian dollar, 5 percent against the South Korean currency, 16 percent against the Taiwan dollar, 18 percent against the U.K. pound, and rose 242 percent against Brazil's currency, 9 percent against the Pakistan currency, 92 percent against the Argentine currency.[22] Also, a declining dollar may have reduced the purchasing power of oil exporting nations since petroleum is priced in U.S. dollars in world markets. In short, the decline in the U.S. dollar's exchange rate has been only a slightly positive factor in U.S. agricultural trade through mid-1987, with most of the positive impact being on oilseeds rather than grains.

Future exchange rate impacts on U.S. agriculture will depend partly on whether a broader-based decline in the value of the U.S. dollar can be achieved, as well as on the availability of competing farm product supplies in world markets. As long as supplies of foreign exporters are large, these nations appear likely to offer their products at whatever prices are needed to meet U.S. competition and move supplies into world markets. Over time, lower world prices stemming from U.S. price support and exchange rate policies should encourage increased growth of world grain, oilseed, and meat utilization, and increased agricultural trade. Lower world prices for grains and the weaker U.S. dollar also may encourage slightly reduced applications of major inputs such as fertilizer and may cause idling of some marginal quality land in some areas, thus tending to slow or halt the rise in global grain production in the next year or two. However, there may be time lags of at least two to five years before the full effect of a sustained lower U.S. dollar is noticed in agricultural trade patterns.

Update on China and India

During the 1970s, the world grain trade was shocked by the emergence of several countries and regions as large importers of grain. Included in this category were USSR, India, China, Eastern Europe, and Mexico. Some nations in this group had been significant grain exporters in the past. In the 1980s, an opposite shift occurred as formerly large grain importing regions moved to an exporting position. Even more significant, some of the nations involved (China and India) are densely populated and represent over one-third of the world's population.

China emerged as a significant grain and soybean oil importer in the mid-1970s in an effort to maintain and improve the diet of its population of approximately one billion people. India, at times during the mid-1960s and 1970s, experienced serious food problems and imported large volumes of U.S. wheat and other farm products. But by 1984-85, both India and China were exporting modest quantities of grains and oilseeds or oilseed products to other Far East nations. Trade sources indicate these two countries also may have exported some grain and protein meal to USSR in the last three years.

China

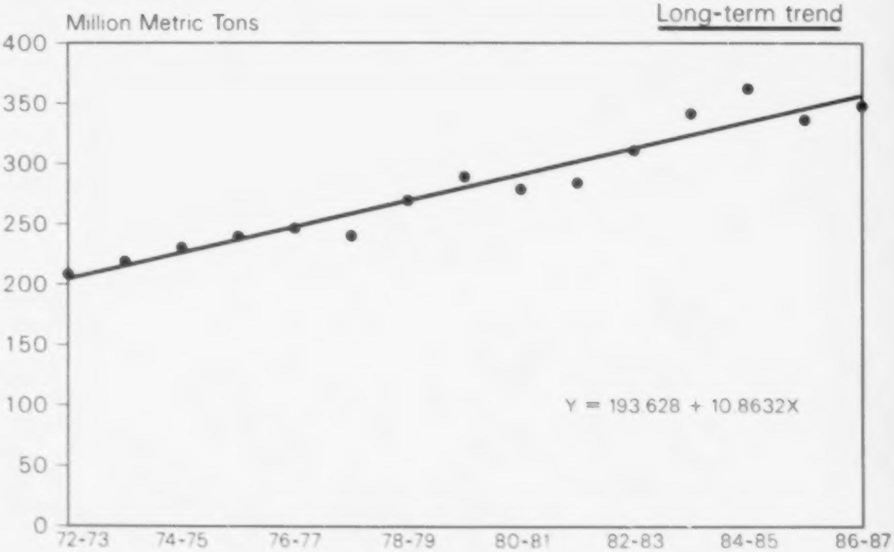
China's grain production has grown at an accelerating rate since the mid-1970s through the combined effects of increased use of technology and changes in its economic system, although the growth rate was temporarily interrupted in 1985-86 by unfavorable weather (see Figure 29). Technological developments include the construction of a large number of new fertilizer plants and increased use of fertilizer, expanded irrigation, improved varieties, and changes in government policies to encourage research. In the late 1970s, China also changed its economic system to allow farm workers greater freedom in managing production and to provide individual economic incentives to farm workers to market excess production in return for cash payments.[23] Increased domestic grain production moved China into a net exporter position in corn and soybeans during the last four years. Its exports have competed with U.S. grain and soybeans in Korea, Japan, and USSR.

Future trends in Chinese grain and soybean exports will depend on China's ability to generate further technological improvements in production through its expanded agricultural research program, as well as trends in urban food consumption patterns.[24] An expected upward trend in Chinese per capita income and a likely increase in consumption of meat and poultry may moderate the expansion of Chinese grain and oilseed exports and could eventually return that nation to an importing position. In addition, China may well become a net grain importer in times of adverse weather and reduced yields during the next few years.

India

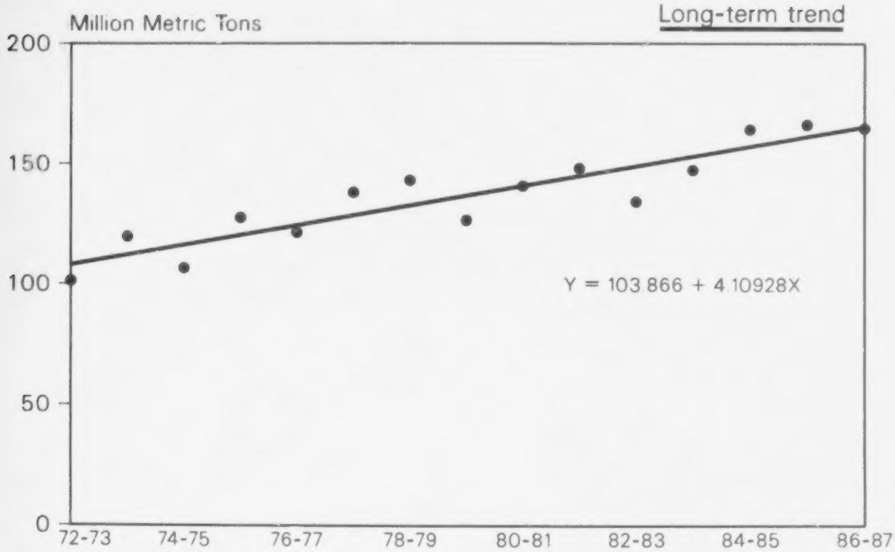
India is the second most populous nation in the world. Its climate has been somewhat more variable than that of China, partly because Indian grain production is heavily dependent on monsoon rains. As shown in Figure 30, India has made impressive strides in grain production in recent years through the use of improved technology. Grain production has been increased by higher yielding varieties, expanded use of fertilizer and irrigation, and improved management. These same factors appear likely to push Indian grain production irregularly higher in the next several years. But with its population of over 700 million people and somewhat variable weather patterns, it seems likely that India will continue to alternate from a grain exporting to an importing position from time to time from now through the mid 1990s. During the past four years, it has been a small exporter of wheat but has still accumulated large carryover stocks.

Figure 29. Trend in Chinese Grain Production, 1972-73 to 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 6-85, April 1985; FG 5-87, April 1987; and various other issues.

Figure 30. Trend in Indian Grain Production 1972-73 to 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 9-76, May 1976; FG 20-78, November 1978; FG 5-80, February 1980; FG 4-81, January 28, 1981; FG 13-82, April 26, 1982; FG 26-83, September 9, 1983; FG 19-83, November 8, 1983; FG 2-85, January 1985; FG 7-85, May 1985; and FG 5-87, April 1987, *World Crop Production* (Washington, D.C.), WCP 4-87, April, 1987.

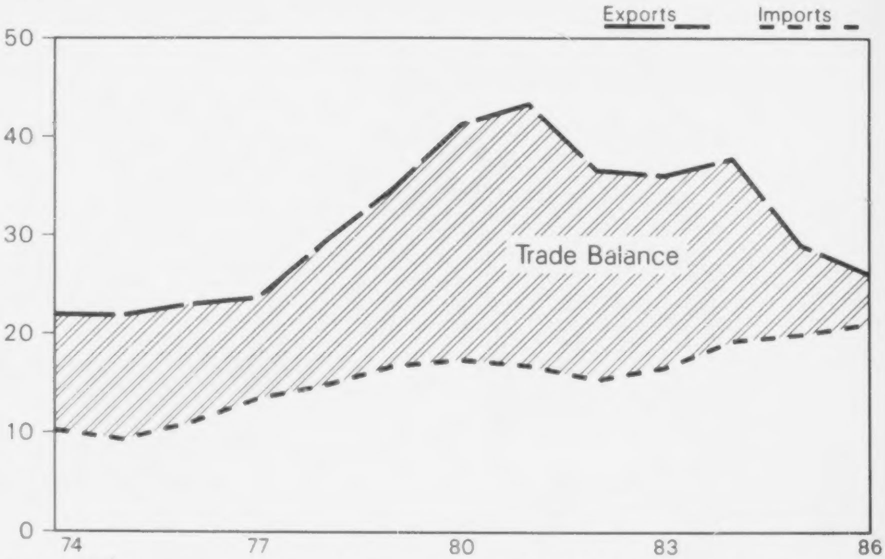
U.S. Agricultural Exports Decline in 1986, Imports Rise

U.S. agricultural exports continued their six-year decline in calendar year 1986, after a brief upward deviation from that trend two years earlier because of temporarily higher farm prices stemming from the 1983 drought and Payment-in-Kind program. Declining U.S. exports in 1986 and 1987 reflected lower prices for most major U.S. agricultural products, as well as sharply reduced physical volumes of U.S. grains being exported in the early part of the period. The volume of U.S. exports continued in a downward trend as a result of large supplies available from competing agricultural exporters at competitive prices, increased self-sufficiency of many importing nations, and slower growth in world consumption of farm products than in the 1970s. Tentative projections place 1986-87 total U.S. agricultural exports at $27.5 billion, five percent above a year earlier but 38 percent below the 1980-81 record.

U.S. agricultural imports also trended upward in calendar year 1986 but may decline slightly in 1987. The nation's total imports of all agricultural products in fiscal 1985-86 reached a record $20.9 billion, up 4.6 percent from 1984-85. Slower growth in U.S. agricultural imports in 1986 and early 1987 in part reflected the sharp decline in the exchange rate of the U.S. dollar against many foreign currencies. The weaker dollar tended to increase the cost of imported goods relative to domestically produced farm products. With imports valued at $20.9 billion and agricultural exports at $26.3 billion in fiscal 1985-86, the U.S. net trade surplus in farm products shrank to only $5.4 billion, slightly less than one-half the level of the previous year. That was the lowest net surplus in U.S. agricultural trade since fiscal 1972 and also was accompanied by a sharp deterioration in the U.S. nonagricultural trade balance.

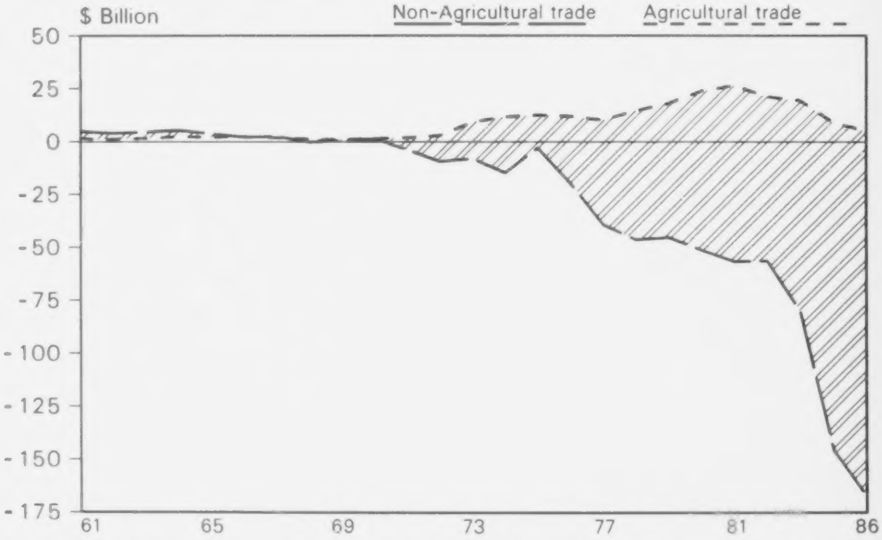
The declining U.S. agricultural trade balance is a matter of serious concern to both the agricultural and nonagricultural sectors of the U.S. economy. For the agricultural sector, it means a loss of income and continued financial problems in production agriculture, reduced demand for inputs such as farm machinery, seed, fertilizer, chemicals, livestock facilities, and equipment. It also means reduced employment in these and other sectors supplying agriculture, as well as in processing, handling, transporting, and exporting farm products. Reduced income and employment in these areas have a negative multiplier effect on economic activity in rural communities as

Figure 31. Dollar Value of U.S. Agricultural Exports and Imports, 1973-86 Calendar Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues.

Figure 32. Net U.S. Trade Balance in Agriculture and Nonagricultural Products by Calendar Years, 1961-86.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues.

farm families reduce expenditures for farm and nonfarm items, with a resulting decline in agriculturally related employment as well as economic activity in main street businesses.

At the national level, the net trade surplus in agriculture traditionally has helped to pay for a substantial part of the imports of nonfarm products. In that way, it has contributed to the economic well being of the U.S. population and also helped to stabilize the exchange rate of the U.S. dollar so that imported items remain reasonable in cost. However, the U.S. nonagricultural trade balance continued to deteriorate sharply in 1985 and now is so large that the modest trade surplus in agriculture offsets only about 3 percent of the total trade deficit. The huge and growing deficit in the nonagricultural sector is due partly to major imbalances in U.S. monetary and fiscal policies. Fiscal policies reflect major federal budget deficits, with a need for those deficits to be financed partly through foreign investments in the U.S. That has created a strong demand for U.S. dollars abroad to be recycled back into the U.S. for investment purposes. And with a somewhat restrictive U.S. monetary policy, the financial market mechanism has caused those dollars to be supplied to foreign investors through large U.S. imports. Nonagricultural U.S. exports in fiscal 1986 totaled $176.6 billion, down 1.5 percent from the previous year. At the same time, nonagricultural imports rose to $342.9 billion, a 9 percent increase from fiscal 1985. The resulting deficit in nonagricultural U.S. foreign trade of $166.2 billion far outweighed the $5.4 billion agricultural trade surplus. For comparison, the U.S. nonagricultural trade deficit in fiscal 1980 was $53.7 billion, and the U.S. agricultural trade surplus was $23.2 billion.

The large and growing U.S. trade deficit, if it is not dealt with soon, has important implications for U.S. economic growth and interest rates, as well as the economic health of U.S. agriculture and other sectors heavily dependent on exports and/or sensitive to import competition. Policy tools for dealing with this problem will be discussed in a later section of this report. Preliminary indications point to a continued large U.S. trade deficit in fiscal 1987, along with little recovery in the value of agricultural exports because of low commodity prices and relatively low volumes of grain exports. Tentative U.S. Department of Agriculture forecasts in late-May 1986 indicated the fiscal 1986-87 U.S. agricultural trade balance will be about $7.5 billion, $2.1 billion more than a year earlier. The forecast includes a 5 percent increase from the previous year in U.S. agricultural exports and a 4 percent decline in U.S. agricultural imports.[25]

Reduced exports have been one of several factors behind continued severe economic pressures in U.S. agriculture and a recent sharp decline in asset values in the U.S. agricultural sector. For the next several years, given approximately normal weather in major foreign grain producing areas, new U.S. farm policies should generate some expansion of the nation's farm product exports. However, growth of U.S. agricultural exports seems likely to remain well below the sharp upward trend of the 1970s. Several more years of adjustment appear necessary before Eastern Europe, Latin America, and other developing nations fully recover from current debt problems. Oil-exporting nations also are experiencing some of these same economic forces, with reduced availability of funds for farm product imports and expected slower economic growth or, in some cases, negative economic growth in the years ahead. Growth rates for U.S. agricultural exports also will depend on future trends in the value of the U.S. dollar. Recent major changes in U.S. policies, with sharply lower price support levels for major crops, and the decline in value of the U.S. dollar should stimulate some growth in volume of U.S. agricultural exports during the next several years. However, a time lag will be involved before export growth rates reflect the full benefit of these actions.

U.S. Government-assisted Export Programs: PL480 Continued, Export Payment-in-Kind Expanded

In contrast to the 1970s when U.S. government export assistance programs were small, official programs to encourage expanded exports have increased greatly in size in the last few years with the downtrend in U.S. commercial sales. These programs have their origins as far back as the 1920s and in the Agricultural Development and Assistance Act of 1954 (Public Law 480). Originally they were intended to: (1) assist in disposal of surplus U.S. agricultural commodities, (2) help countries lacking foreign exchange to purchase U.S. agricultural products, and (3) facilitate U.S. foreign aid efforts.[26] In the last 15 years, similar programs have been developed by Western Europe and Japan. And since the beginning of this decade, emphasis in U.S. programs has increasingly shifted toward: (1) assisting nations that are unable to obtain commercial financing, (2) providing more attractive financing arrangements than are commercially available in order to compete with financing terms and/or price advantages offered by other exporting nations, and (3) reducing world hunger.

Types of Assistance Programs

The U.S. has three main types of concessional export programs for agricultural products: Title I and Title II of PL 480 and AID programs. The PL 480 Title I program provides long-term, low-interest credit with repayment terms of up to 40 years and a grace period of up to 10 years. Repayments are to be made in U.S. dollars or other currencies readily convertible into dollars. U.S. statutes require three-fourths of all food aid exports under Title I to be sent to countries with a per capita Gross National Product (GNP) of $730 or less per year.[27] Prior to fiscal year 1982, the GNP requirement was $680 per year. Title II of the PL 480 program involves food donations for export, with about two-thirds normally shipped by voluntary relief agencies. In fiscal year 1982, Title II shipments were supplemented by an additional 27 percent contributed from the World Food program and 9 percent from government-to-government export programs. Until recently, India was a major recipient of Title II agricultural exports. That nation accounted for slightly over one-fifth of such shipments n fiscal year 1981-82.[28]

The AID (Agency for International Development) program was begun in 1979 to provide financial grants and loans for agricultural commodity purchases. After its inception, strong emphasis for such financing was first given to Israel and later extended to Egypt and Sudan.[29] Table 18 and Appendix V, Table 1 show the distribution of U.S. farm product exports under concessional programs by commodities in recent years. These programs have been oriented heavily toward soybean oil, wheat, flour, and nonfat dry milk.

U.S. Government Loan Guarantees [30]

During the past several fiscal years, the U.S. administration and Congress have given sharply increased emphasis to U.S. government loan guarantees and other non-PL 480 export assistance programs. By the 1983-84 fiscal year, about one-eighth of the total dollar value of U.S. agricultural exports was accounted for by combined shipments under such programs and PL 480 programs, in an effort to halt the downward trend of U.S. agricultural exports. In fiscal 1986-87, over 90 percent of U.S. wheat exports moved under some type of government export assistance program. Commodity Credit Corporation (CCC) loan guarantees (GSM 101 and 102 funds) are a cornerstone of the non-PL 480 programs. These funds are used to assist exporting firms in making sales to foreign buyers who have difficulty obtaining commercial credit. With CCC loan guarantees, private lending institutions provide short-term or intermediate-term credit for purchases of U.S. farm products. The CCC, a U.S. government agency, guarantees repayment of the loans and a sizable part of the interest. U.S. Department of Agriculture officials indicate the repayment history on CCC-guaranteed loans generally has been good. However, one exception is Poland. CCC has found it necessary to make some payments on loans to that nation in the past few years because of its severe financial problems. With serious debt problems in many developing nations, some analysts express concern that future repayment rates may be less favorable than in the past.

One important example of the use of CCC-credit guarantees is Mexico. With its severe 1982-83 financial crisis, over $1 billion in CCC credit guarantees were allocated to that nation in fiscal 1982-83 along with sizable allocations since then to maintain continued imports of U.S. farm products. Mexico has used this financial assistance to purchase U.S. corn, grain sorghum, wheat, soybeans, and other farm products.

In 1982-83, to further encourage U.S. farm product exports, the U.S. government for a short period of time used a Blended Credit program. The program was continued through the middle of the 1984-85 fiscal year before being at least temporarily discontinued. It involved a one-tenth blend of interest-free government loans (GSM 5 funds) and nine-tenths CCC credit guarantees (GSM 102 funds) that normally cover up to 98 percent of the principal and up to 8 percentage points of interest. Major commodity emphasis in the Blended Credit program was given to wheat, flour, and soybean oil. A special effort was made to ensure that blended credit sales were beyond quantities that recipient countries would have purchased without the program. In addition, the program was viewed as a tool for increasing the U.S. share of world food trade and for competing with subsidized sales from the exporters, particularly the European Community. However, full achievement of such objectives requires that competing exporters not respond with their own expanded export incentive programs and that they take action to reduce production and/or store surplus supplies of agricultural products. These response conditions were not met in the Blended Credit program.

Cargo Preference and Export Assistance Programs

United States laws previously required that 50 percent of all U.S. concessional exports of farm products be shipped in American flag ships. Such legislation originally was enacted to help ensure that the U.S. would maintain a viable merchant marine fleet for national defense purposes. In recent years, freight rates for U.S. vessels have been $.40

o $.80 or more per bushel above comparable rates for foreign vessels, with the exact differential depending on vessel size, shipping route, destination, and other variables. The U.S. flag ship requirement is known as cargo preference and was applied to PL 480 shipments, but not to the Blended Credit program until the spring of 1985. Prior to that time, the U.S. Department of Agriculture considered the Blended Credit program a commercial sales program rather than a concessional export program. However, a court decision in March 1985 determined that the program involved concessional sales and therefore must meet cargo preference requirements. The added cost of shipping in U.S. vessels would have, in most cases, more than offset any advantages to the foreign buyer from lower financing costs, and would have made the program unattractive. As a result, the administration halted sales under the Blended Credit program.

In the Food Security Act of 1985, the U.S. Congress modified the cargo preference requirement by increasing the required percentages of commodities to be shipped in U.S. flag ships to 75 percent. The increase will occur over a three-year period with a 10 percentage point increase in 1986 and 1987, and a 5 percentage point increase in 1988. In addition, shipments of grain under the Export Payment-in-Kind and Blended Credit programs were specifically excluded from the cargo preference requirements.[31] These changes and a Congressional requirement that the U.S. government use at least $1 billion in government-owned commodities for Export Payment-in-Kind programs during 1986 through 1988 have led to an extremely sharp increase in government assistance for several U.S. agricultural commodity exports, especially wheat, barley, and sorghum.[32]

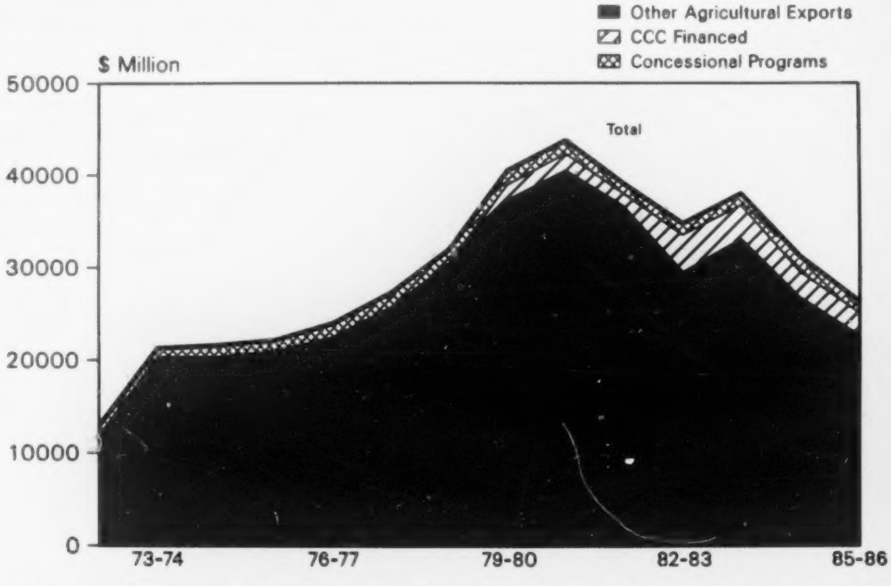
Figure 33 shows the increased importance of government-assisted U.S. export programs since the late 1970s and their expanded role in total U.S. farm product exports. Prior to the late 1970s, these programs accounted for only a small fraction of all U.S. agricultural exports. Increased emphasis on government-assisted exports began just before the start of this decade, as developing nation debt problems began to emerge. With reduced U.S. farm product exports since 1980-81, the U.S. Congress and administration have sharply increased funding for agricultural export assistance, and current political pressures in the U.S. likely will result in continued high levels of funding for these programs in the next few years.

Table 18. U.S. Concessional Government Agricultural Exports as Percent of Total Exports by Major Commodities, Fiscal Years 1977 and 1979 through 1986.

Commodity Products	1977	1979	1982	1983	1984	1985	1986
Wheat and Flour	17.5	13.0	7.4	10.6	8.6	14.9	18.0
Corn	2.5	3.7	1.4	2.3	2.4	2.0	2.1
Soybean Oil	22.0	17.3	27.7	29.3	27.8	39.6	35.4
Cotton (exc. Linters)	1.2	1.0	0.4	0.6	0.5	0.5	0.9
Milk, nonfat dry	99.8	83.4	27.3	8.7	18.8	72.0	41.8
Others	4.2	2.6	1.2	0.8	1.4	2.9	1.8

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* January-February 1987 and various other issues.

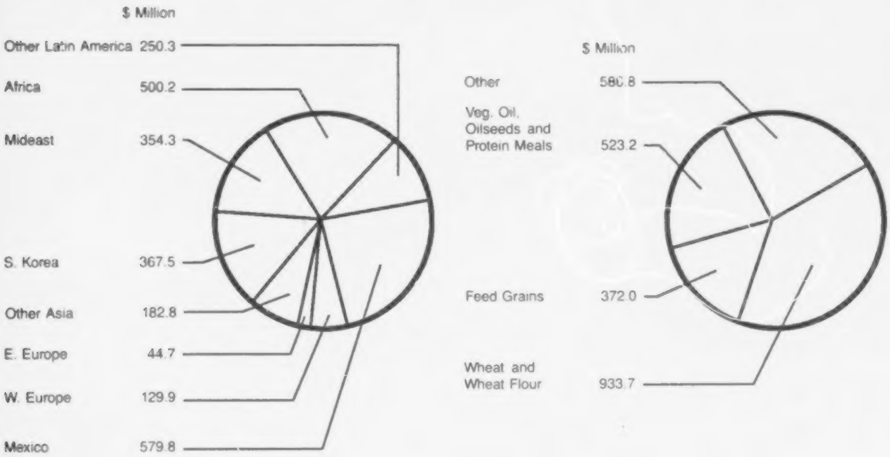
Figure 33. Dollar Value of U.S. Agricultural Exports Under Government Assisted Programs and Other Sales 1971-85 Fiscal Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues; U.S. Department of Agriculture, Foreign Agricultural Service *Summary of Exports*, GSM 101, GSM 102, GSM 201, GSM 301, unpublished material (Washington, D.C.), December 1982; and *Notice To Recipients: Summary of FY 83, FY 84, FY 85, and FY 86 Export Values and Quantities for GSM 102 and Blended Credit* unpublished material (Washington, D.C.), January 1985.

Figure 34. Distribution of Commodity Credit Corporation Export Credit Guarantees by Destinations and Products, Fiscal Year 1985-86.

CCC Credit



Source: U.S. Department of Agriculture, Foreign Agricultural Service *Summary of Exports*, GSM 101, GSM 102, GSM 201, GSM 301, unpublished material (Washington, D.C.), December 1982, and *Notice to Recipients; Summary of FY 83, FY 84, FY 85, and FY 86 Export Values and Quantities for GSM 102, GSM 103, and Blended Credit* unpublished material (Washington, D.C.), January 1985.

Figure 34 shows the composition of CCC Credit Guarantee programs by major destinations and products in fiscal year 1985-86. Major destinations under the CCC Credit Guarantee programs were Latin America, Africa, South Korea, the Middle East, other Asia, and Western Europe, in that order. Wheat, feed grains, and oilseed products were major commodities involved. Blended Credit and Export Payment-in-Kind programs were targeted heavily toward Africa, the Middle East, Eastern Europe, and China, with wheat, wheat flour, and barley representing the major commodities exported under these programs.

J.S. Agricultural Trade Trends by Commodity Groups

s shown in Figure 35 and Table 19, the tal dollar value of U.S. agricultural exports eclined sharply in the 1985-86 fiscal year. otal agricultural exports were valued at 26.3 billion, 16 percent below the previous ear, and sharply below the 1980-81 level. eclines were especially pronounced in 985-86 in grains and cotton, with crop xport values being reduced both by harply lower prices and reduced export olumes. The value of U.S. feed grain xports in 1985-86 fell 45 percent below the revious fiscal year, with wheat and wheat roduct exports down 22 percent in value nd cotton exports down 65 percent. xports of animal products, oilseeds, lseed products, and fruits increased in alue for the year.

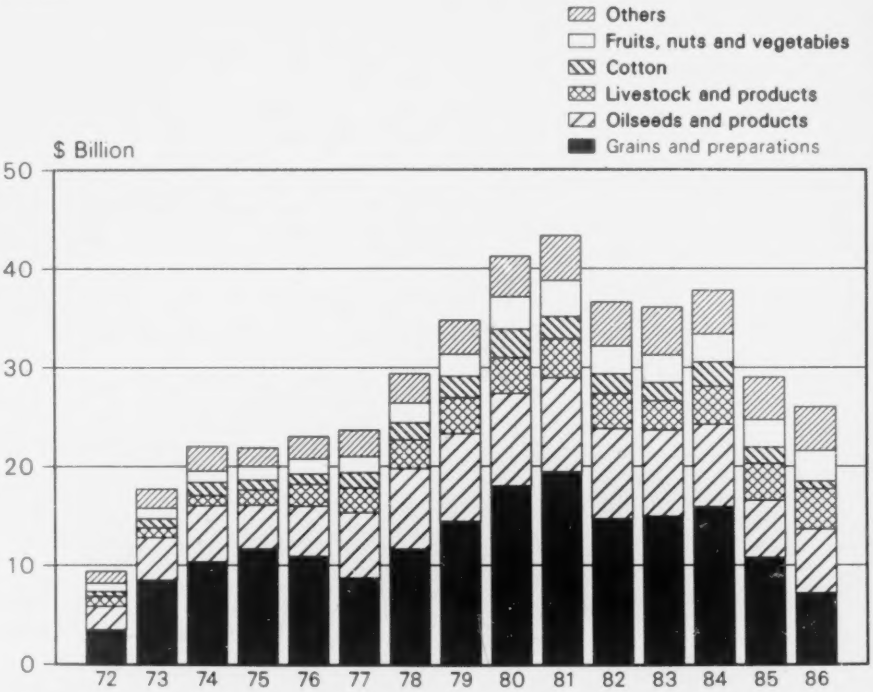
omposition of U.S. gricultural Exports

rain and oilseed exports, as indicated in gure 35, accounted for a large part of the rowth of agricultural exports from 1970 rough 1981. These same products also ave accounted for much of the drop in alue of exports since 1981. Livestock and oultry exports now make up about 17 ercent of all U.S. agricultural exports in ollar value. The value of these exports as group in 1985-86 was 7 percent larger an four years earlier, while cotton exports ere less than one-third as large as four ears earlier. The value of fruit, nut, and egetable exports dropped moderately in e past four years, with the value lower an in 1980-81, despite a modest recovery value in 1985-86. Grain and grain product xports during the same period declined by 5 percent. Grains, feeds, oilseeds, and lseed products together accounted for pproximately two-thirds of U.S. agricultural xports in recent years, but their share ropped to 60 percent in 1985-86. Exports grains and cotton are increasing in fiscal 986-87 in response to changing U.S. overnment programs, although increases volume will likely be offset by reduced rices per unit.

.S. Agricultural Imports

previous issues of this report, it has been oted that sustained trading relationships equire a two-way exchange between trad- g partners. If the United States is to xport products and services to other ountries, it must also be willing to import om those countries in order to maintain a isting trading relationship. In other words, roducts Americans buy from other counies generate earnings that those countries an use to purchase U.S. exports. In this rocess, trading partners usually export roducts that can be produced more

Figure 35. Value of U.S. Agricultural Exports by Commodity, 1972-86 Calendar Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues. Livestock excluding poultry and dairy products.

Table 19. Composition of U.S. Agricultural Exports by Type of Commodity, 1976-77, 1980-81, 1984-85, and 1985-86 in Billions of Dollars.

Commodity Group	October-September Fiscal Years 1976-77	1980-81	1984-85	1985-86	Percentage of 1985-86 Total Exports
Feed grains	5.39	10.40	6.79	3.75	14.2
Oilseeds	4.64	6.98	4.32	4.39	16.7
Oilseed meal	0.97	1.67	0.85	1.13	4.3
Vegetable oils	0.77	1.10	1.02	0.75	2.8
Wheat and wheat products	3.05	8.05	4.53	3.55	13.5
Rice	0.69	1.54	0.68	0.65	2.5
Meat and meat products	0.61	0.99	0.91	1.01	3.8
Hides and skins	0.80	1.00	1.32	1.46	5.5
Dairy products	0.17	0.24	0.41	0.43	1.6
Poultry and poultry products	0.30	0.77	0.39	0.46	1.7
Other animals and animal products	0.77	1.11	1.04	1.01	3.8
Cotton	1.54	2.23	1.95	0.68	2.6
Fruits, vegetables, and nuts	2.45	3.56	2.83	2.91	11.1
Tobacco	1.08	1.34	1.59	1.32	5.0
Others	0.78	1.63	2.57	2.82	10.7
Total	24.01	42.61	31.20	26.32	99.8

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1986, November-December 1982, and November 1977.

efficiently at home. These same trading partners also tend to import products that can be produced more economically by their trading partners. Through this process, participants on both sides of the trading transaction can increase their standards of living over levels that would otherwise exist and can carry on a substantial trading relationship over an extended period of time.[33] Because of this principle of comparative advantage, the U.S. imports a sizable volume of certain agricultural commodities.

Table 20 shows the composition of U.S. agricultural imports in 1985-86 and comparisons with recent years. Slightly over one-third of all U.S. agricultural imports is represented by products not produced commercially in the United States or produced only in very limited quantities because of climatic limitations. These products are classified as complementary imports because they do not compete directly with domestic production. Included in this category are coffee, tea, rubber, cocoa, drugs, bananas, and other tropical fruits. The largest single commodity in dollar value in this group, coffee, accounted for 56 percent of all complementary imports in fiscal 1985-86. Total U.S. imports of complementary agricultural products in fiscal 1985-86 rose 15 percent above the previous year, with much of the increase reflecting higher prices for coffee. Supplementary agricultural product imports increased by only 0.8 percent in value in the 1985-86 fiscal year.

Supplementary imports are those products that compete with domestic production. As shown in Table 20, the three largest supplementary import groups are: (1) fruits, nuts, vegetables, and associated products; (2) meat and meat products; and (3) alcoholic beverages. Despite a restrictive U.S. sugar import policy and sharply declining sugar imports, U.S. sugar and sugar product imports are the fourth largest supplementary import group. Meat and meat product imports in 1985-86 accounted for about 11 percent of the dollar value of all U.S. agricultural imports. Alcoholic beverages and tobacco imports together accounted for approximately 11 percent of the total, along with 13 percent for fruits, nuts, vegetables, and preparations. While the United States is a large net exporter of oilseeds, oilseed products, grains, and feeds, it also imports small quantities of these products. With the exception of palm oil and coconut oil, these imports usually originate in Canada and represent marketings from elevators, processors, and farmers located near the U.S. border. In the same way, modest quantities of U.S. products sometimes flow across the U.S. border into Canada, although the strong U.S. dollar relative to the Canadian dollar in the past four years has discouraged this and, instead, has encouraged increased U.S. imports of Canadian products. U.S. imports of palm oil originate largely in Malaysia, with the volume depending on the price advantage relative to soybean oil. U.S. coconut oil imports typically come from the Philippines.

Figure 36 shows the trend in U.S. imports of agricultural products by major commodity groups since the early 1970s. The value of sugar imports has dropped sharply since the late 1970s because of lower prices, and technological developments in corn processing that have brought sharply increased use of high-fructose corn sweeteners in U.S. soft drinks and processed foods as a substitute for sugar. Trends in exports of livestock products and U.S. imports of meat are shown in Figures 37 and 38.

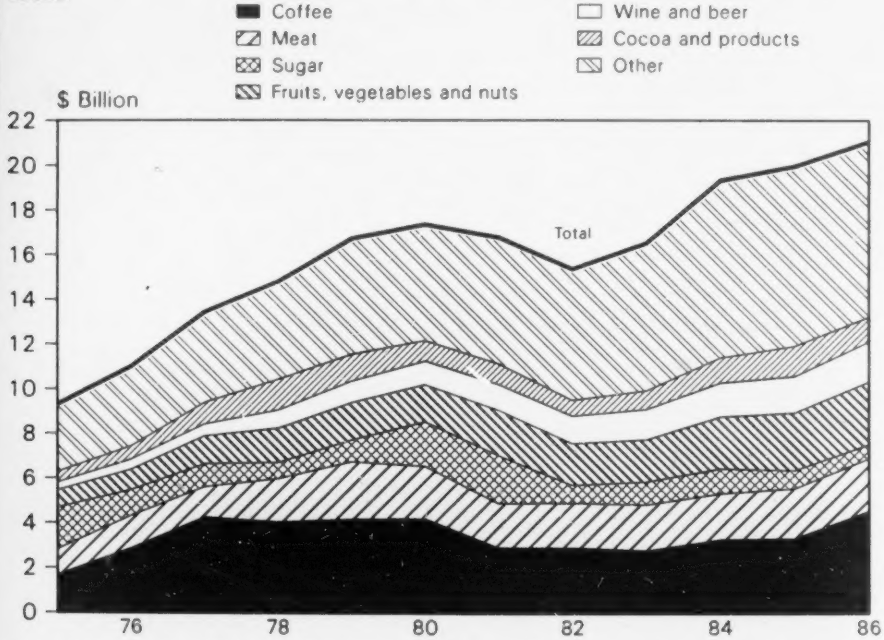
Table 20. Value of U.S. Agricultural Imports in 1975-76, 1983-84, 1984-85, and 1985-86 October-September Fiscal Years by Commodity Groups in Billions of Dollars.

Product	1975-76	1983-84	1984-85	1985-86	Percent Change 1975-76 to 1985-86
Complementary Imports:					
Cocoa and chocolate	0.60	1.06	1.29	1.19	+98
Coffee	2.39	3.30	3.24	4.40	+84
Rubber	0.47	0.85	0.68	0.61	+30
Tea	0.09	0.19	0.18	0.14	+56
Bananas and plantains	0.26	0.67	0.75	0.74	+185
Drugs	0.11	0.20	0.20	0.18	+64
Others	0.28	0.41	0.43	0.54	+93
Total complementary imports	4.21	6.68	6.78	7.80	+85
Supplementary Imports:					
Dairy products	0.26	0.76	0.76	0.79	+204
Hides and skins	0.20	0.22	0.24	0.20	0
Meat and meat products, excluding poultry	1.44	1.93	2.21	2.25	+56
Poultry and poultry products, excluding eggs	0.09	0.09	0.08	0.09	0
Other animal products and animals	0.33	0.92	0.86	0.96	+191
Total animals and animal products	2.31	3.92	4.15	4.28	+85
Fruits, nuts, vegetables, and products	0.88	2.28	2.49	2.80	+218
Sugar and products	1.35	1.46	1.28	1.00	−26
Alcoholic beverages	0.43	1.51	1.55	1.78	+314
Oilseeds and products	0.54	0.80	0.78	0.64	+19
Grains, grain products, and feed	0.23	0.53	0.60	0.67	+191
Tobacco	0.28	0.56	0.56	0.61	+118
Others	0.30	1.17	1.55	1.30	+333
Total supplementary imports	6.31	12.24	12.96	13.07	+107
Total agricultural imports[a]	10.51	18.92	19.74	20.88	+99

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1986, November-December 1985, November-December 1984; and November 1977.

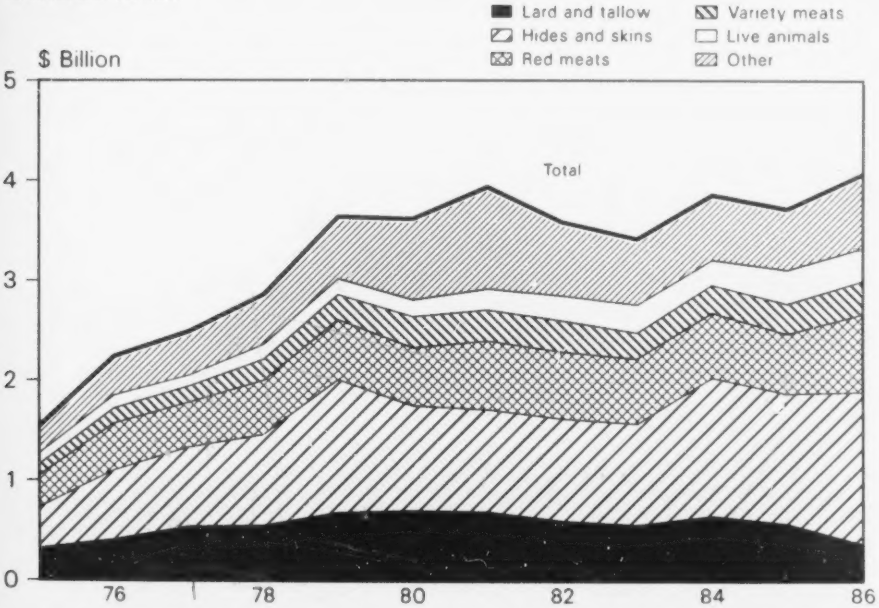
[a] Totals may not add due to rounding.

Figure 36. Value of U.S. Agricultural Imports by Commodity, 1974-86 Calendar Years.



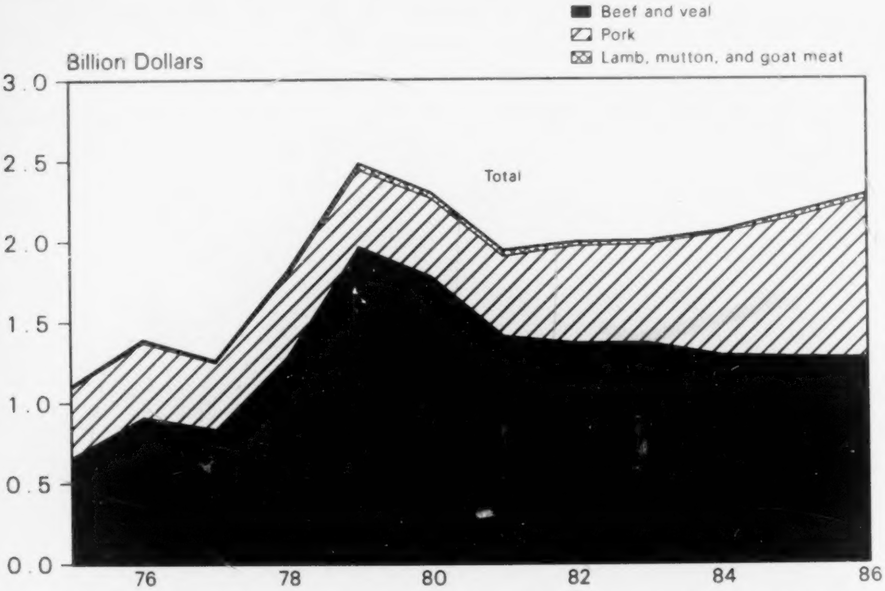
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues. Note: fruits, vegetables, and nuts include bananas. Other includes dairy products, oilseeds and products, rubber, and other imports.

Figure 37. Value of U.S. Livestock Product Exports by Type of Product, 1974-86 Calendar Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues. Poultry exports are included in the "other" category.

Figure 38. Value of U.S. Red Meat Imports by Type of Product, 1974-86 Calendar Years.



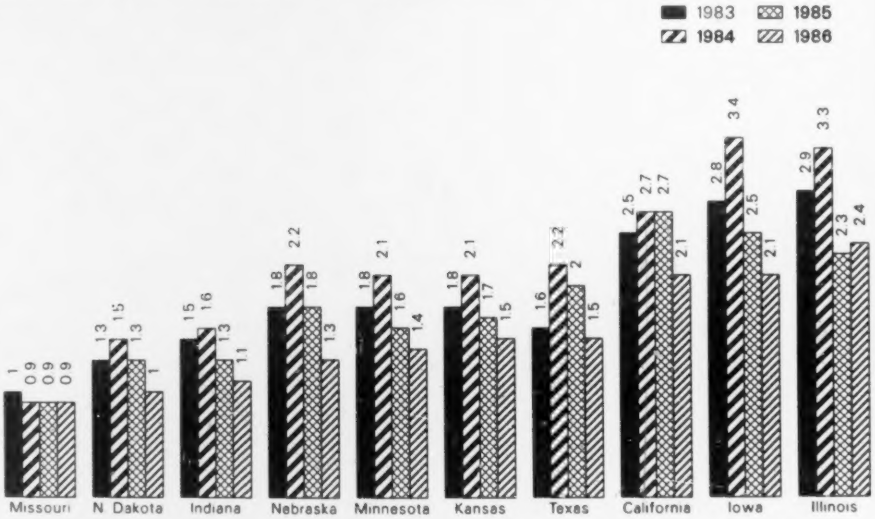
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues.

J.S. Agricultural Exports by .eading States and by Economic Groupings of Destinations

'he value of U.S. farm product exports by
0 leading states for the past three fiscal
ears is shown in Figure 39. The top four
xporting states are California, Illinois, Iowa,
nd Kansas, in that order, with other top-
anking exporting states located in major
rain-producing areas of the midwest.
linois and Iowa are large exporters of
oarse grains, soybeans, soybean prod-
icts, and livestock. California and Texas
eflect greater diversity in exports including
ruits, vegetables, cotton, and nuts, as well
s grain and livestock products. The relative
anking of the top 10 agricultural exporting
tates has changed little in the past six
ears, but occasionally shifts slightly from
ear to year depending on the size of crops
n individual states. In 1984 Ohio replaced
Aissouri in tenth place, partly because of
evere drought the previous year that
dversely affected Missouri crop
roduction.

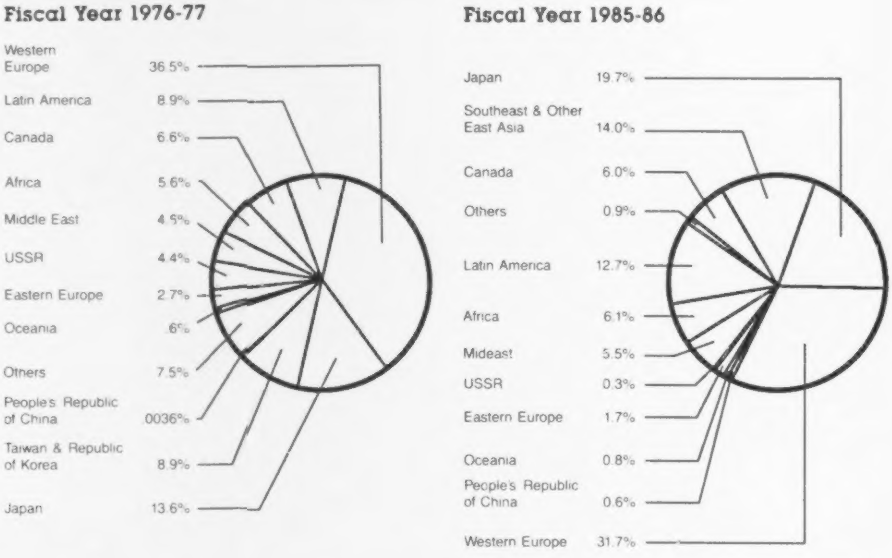
igures 40 through 42 show total U.S.
gricultural exports, as well as corn and
vheat exports by geographic destinations
ow and in the mid-1970s. Western Europe
as declined sharply in importance as a
narket for these products in recent years,
vhile Japan and less developed countries
ave grown in importance as a market for
J.S. corn. For combined exports of all U.S.
arm products, major growth areas since the
arly 1970s include Latin America, South-
ast and East Asia, and Japan, along with
noderate growth in exports to Africa. U.S.
gricultural exports to Eastern Europe de-
lined moderately from 1976-77 to 1986-87.

Figure 39. Value of U.S. Agricultural Exports by Selected States in Billions of Dollars, Fiscal Years 1982-83 through 1985-86.



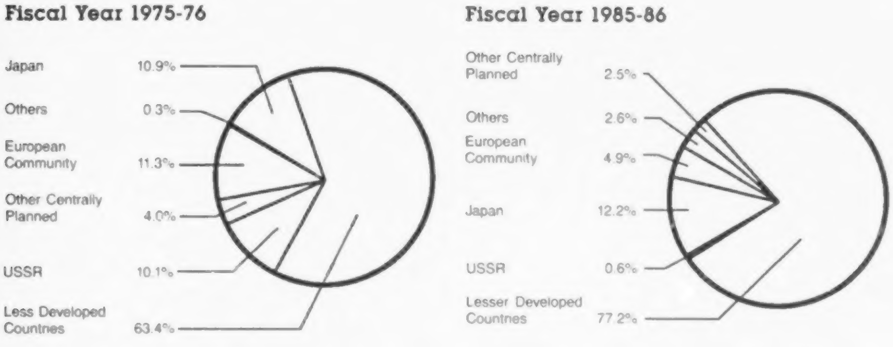
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), March-April 1986 and various other issues and personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

Figure 40. U.S. Agricultural Export Percentage Shares to Selected Destinations, 1976-77 and Projected 1985-86 Fiscal Years.



Source: Personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

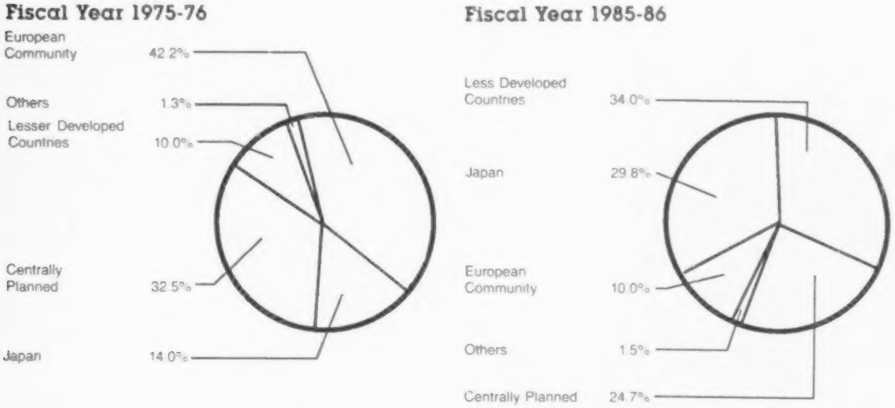
Figure 41. U.S. Wheat Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1985-86.


Fiscal Year 1975-76

Fiscal Year 1985-86

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 37-82, December 8, 1982 and Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues. Lesser developed countries include rapidly and moderately developing nations (excluding Greece) and other developing nations.

Figure 42. U.S. Corn Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1985-86.


Fiscal Year 1975-76

Fiscal Year 1985-86

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* (Washington, D.C.), FG 37-82, December 1982 and Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues. Lesser developed countries include rapidly and moderately developing nations (excluding Greece, Spain and Portugal) and other developing nations.

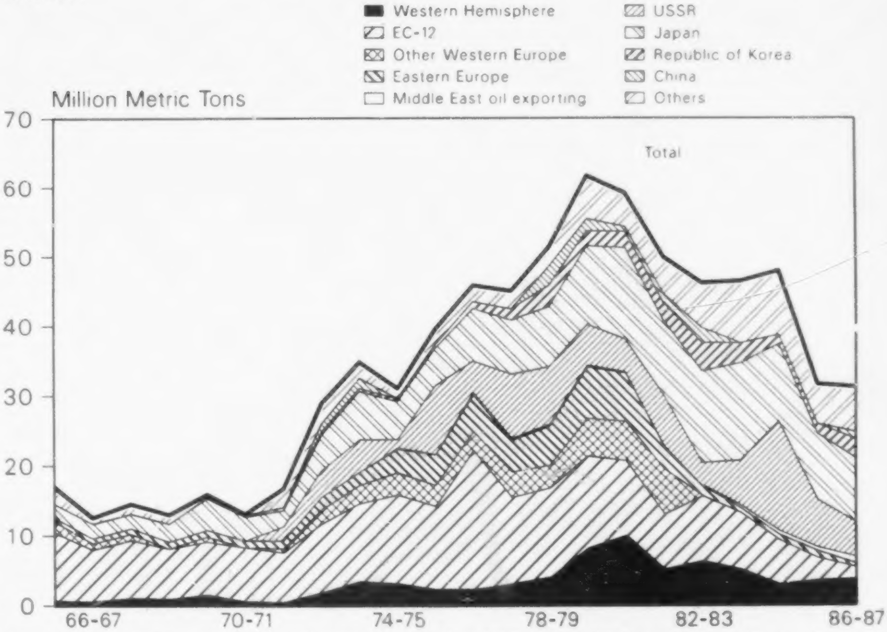
ends in U.S. Corn and Coarse ain Exports by Destination

ures 43 and 44 show a continued
amatic change in the level and destina-
n of U.S. corn and coarse grain exports
ce the late 1970s. During most of the
st two decades, the industrial economies
Western Europe and Japan represented
e largest foreign outlets for these U.S.
ains. Since 1979-80, however, the once-
ge EC market for U.S. corn has dropped
arply in size along with a modest decline
exports to other West European nations.
en the traditionally stable Japanese and
public of Korea markets also have de-
ned slightly in size as other competitors
ve taken steps to export to these nations.
ina, after being a market outlet for U.S.
rn from 1975-76 through 1982-83,
opped its purchases in U.S. corn to zero
m 1983-84 through 1985-86 and, in fact,
came a corn exporter. While China is
porting some U.S. corn in 1986-87 for the
t time in three years, that country also
ntinues to export some corn and is
pected to remain a net corn exporter for
e marketing year. Chinese exports have
en an important factor behind recent
clining U.S. corn and coarse grain
ports to the Republic of Korea and Japan.

rtially but not completely offsetting these
nds, Latin America has increased in
portance as a market destination for U.S.
rn, along with modest growth in exports
Eastern Europe. The most dramatic
ange in U.S. corn and coarse grain
ports, however, was the extremely sharp
crease in USSR purchases in 1985-86
h imports of American corn by that
tion dropping to less than half the
evious year's record. Preliminary data
ggest its 1986-87 imports of U.S. corn
ay be down even further. The Soviet Union
counted for about one-third of all U.S.
rn exports in the 1984-85 marketing year
ding September 30, 1985, and one-sixth
1985-86. The sudden upsurge in Soviet
rchases of U.S. corn in 1984-85 reflected
at nation's serious 1984 crop problems
e to widespread drought, along with
cord livestock inventories early in the
ason. The decline in its 1985-86 and
86-87 imports reflected substantially im-
oved crops in 1985 and 1986, due at least
rtly to improved weather.

rly and highly tentative indications point
modestly larger total U.S. corn and
arse grain exports in 1986-87, although
e exact level of shipments will be influ-
ced by the success of reduced U.S.
vernment price support levels, as well as
e size of the 1987 USSR grain and forage

Figure 43. U.S. Corn Exports by Destination, October-September 1964-65 to 1986-87.[a]

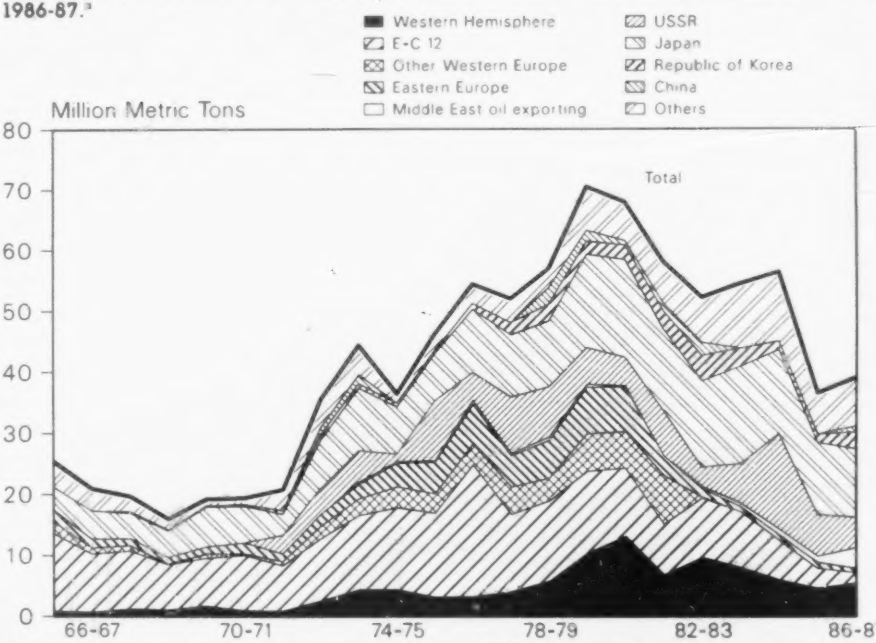


Note: 1986-87 exports are projected using the October 1986-March 1987 percentage change from a year earlier.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues, and *Grain Market News* (Independence, Mo.), various issues.

[a]From 1982-83 on, the EC is EC-12.

Figure 44. U.S. Coarse Grain Exports by Destination, October-September 1964-65 to 1986-87.[a]



Note: 1986-87 exports are projected using the October 1986-March 1987 percentage change from a year earlier.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues, and *Grain Market News* (Independence, Mo.), various issues.

[a]From 1982-83 on, the EC is EC-12.

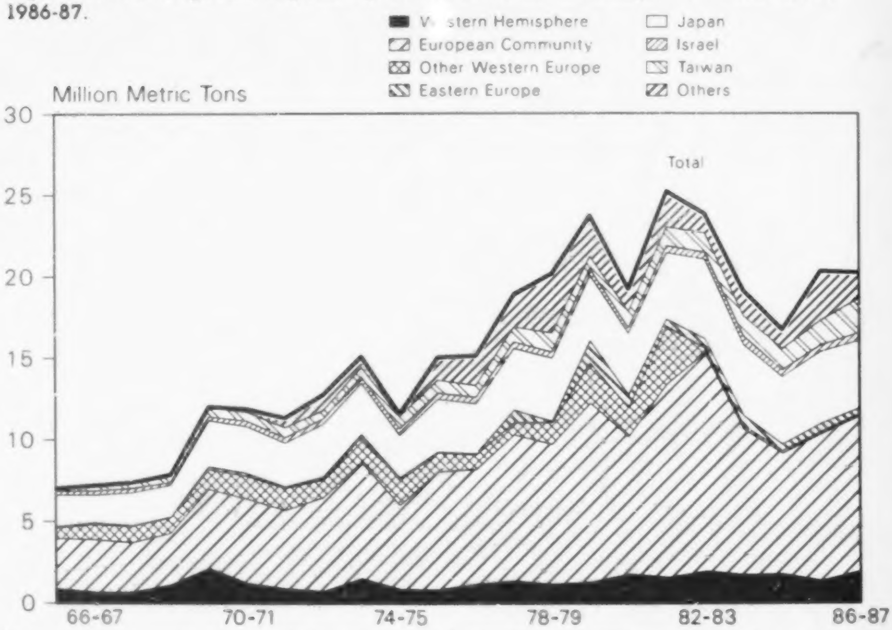
harvests. Several developments, including changing U.S. farm programs and stability or modest additional weakness in the American dollar, appear to be setting the stage for additional modest growth in U.S. corn and coarse grain exports in the late 1980s and early 1990s. However, global debt problems, strong foreign competition, and slower economic growth appear likely to hold export growth rates during that period well below those of the 1970s.

Trends in U.S. Soybean and Soybean Product Exports by Destination

For more than two decades, the industrial economies of Western Europe and Japan have been the major foreign outlets for U.S. soybeans and soybean meal, with soybean meal being an important input for livestock and poultry production (see Figures 45 and 46). U.S. soybean oil exports, on the other hand, are shipped primarily to developing nations where they are used for direct human consumption as cooking oils (see Figure 47). Until 1982-83, U.S. soybean and soybean meal exports exhibited a strong upward trend driven by growing consumer demand for livestock and poultry products and limited growth of competing protein meals.

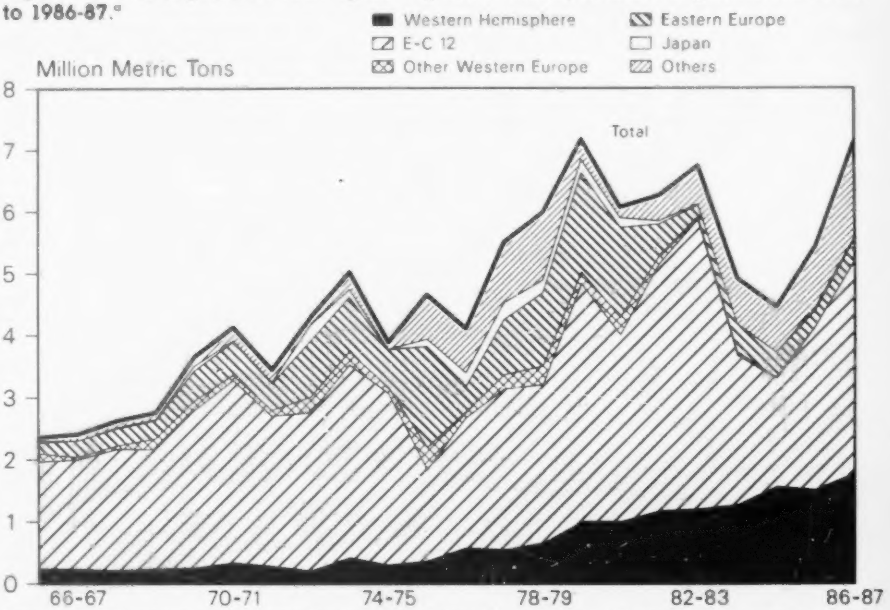
Growth in foreign demand for U.S. soybeans and meal during the past two decades was greatest in the European Community, which until recently has accounted for approximately two-thirds of all U.S. soybean meal exports and approximately half of its soybean exports. Growth in this market during the 1970s was encouraged by rising consumer incomes, high domestic EC support prices for grain, a weak U.S. dollar, and an absence of EC import restrictions on soybeans and soybean meal. The EC's Common Agricultural Policy (CAP) maintained internal grain prices well above world levels, and a complex price support mechanism automatically adjusted its grain prices for changes in the exchange rate of the U.S. dollar, as it affected grain import costs. In contrast, soybean and meal imports enter EC at world price levels, with the weak U.S. dollar further enhancing soybean meal's attractiveness as a feed ingredient. The combination of EC support prices for coarse grains sharply above the world levels and EC soybean meal priced at world levels created a soybean meal/corn price ratio in the EC much more favorable for soybean meal feeding than in the U.S. and most other nations. As a result, soybean meal in the EC was fed both as a protein source and as an energy source or grain

Figure 45. U.S. Soybean Exports by Destination, October-September 1964-65 to 1986-87.



Note: 1986-87 exports are projected using the October 1986-March 1987 percentage change from a year earlier.
Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues, and *Grain Market News* (Independence, Mo.), various issues.

Figure 46. U.S. Soybean Meal Exports by Destination, October-September 1964-65 to 1986-87.[a]



Note: 1986-87 exports are projected using the October 1986-March 1987 percentage change from a year earlier.
Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues, and *Grain Market News* (Independence, Mo.), various issues, and *Foreign Agricultural Circular*, Oilseeds and Products (Washington, D.C.), FOP 11-86, November 1986; U.S. export sales April 3, 1986 and April 2, 1987.

[a] From 1983-84 on, the EC is EC-12.

substitute.[34] In 1983-84, with a sudden, dramatic rise in soybean and soybean meal prices caused by the U.S. drought, the PIK program and the strong U.S. dollar, the EC computerized feed manufacturing operations and reduced the amount of soybean meal being used as a grain substitute. Declining U.S. soybean meal exports to EC continued into 1984-85, before turning upward again in the September-August 1985-86 and 1986-87 marketing years. U.S. soybean exports to EC followed a similar trend but declined less drastically in 1984-85.

Other contributing factors behind the sharply lower EC purchases of U.S. soybeans and meal in the mid-1980s include: (1) a sluggish general economy with slower growth in EC incomes than in the 1970s and high unemployment, (2) a dairy surplus reduction program that sharply reduced manufacturing dairy feed sales in 1984-85,[35] (3) sharply expanded EC wheat feeding, and (4) large imports of U.S. corn gluten feed and meal as a substitute for soybean meal. Wheat has a higher protein content than corn, which it has replaced in livestock and poultry rations, thus reducing soybean meal requirements. Corn gluten feed and meal are byproducts of the rapidly growing U.S. corn sweeteners and alcohol fuels industry, with around 3.5 million metric tons of these products being exported to EC in the last four years.[36] U.S. soybean meal exports to EC in 1985-86 totaled 2.6 million metric tons, down from about 3.9 million tons in 1979-80.

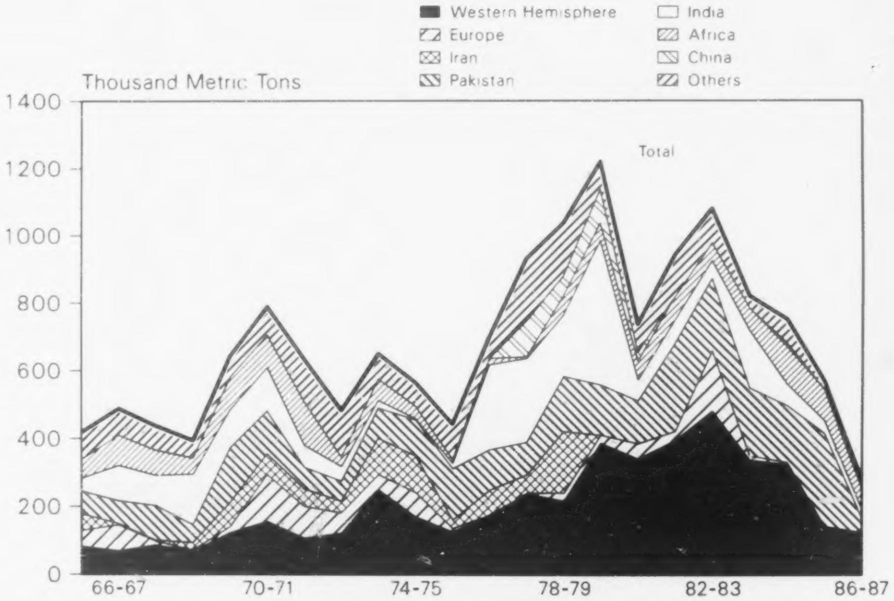
Rising U.S. soybean and soybean meal exports in 1985-86 and early 1986-87 reflected slightly accelerated economic growth in a number of foreign countries. Some improvement in economic conditions was observed in the West European livestock sector due to a sharply decreased March-May 1986 soybean harvest in Brazil because of adverse weather and the weaker U.S. dollar.

Figures 45 and 46 indicate U.S. soybean and soybean meal exports briefly experienced a sharp decline in the mid-1970s. The decline at that time was triggered by a weather-reduced U.S. soybean crop in 1974, as well as a temporary world business recession. Reduced U.S. supplies generated sharply higher prices, which brought a rationing of usage in the EC as soybean meal prices increased sharply in relation to coarse grains. Utilization was much less affected in other countries where the coarse grain/soybean meal price ratio was not artificially influenced by government policies. After soybean and meal prices declined to more normal levels, U.S. exports to EC fully recovered within a three-year time period.

U.S. soybean and soybean meal exports in the years immediately ahead will depend on the exchange rate of the U.S. dollar, as well as EC livestock and dairy policies and world economic growth. The strengthening dollar in the early 1980s created a price shock in EC meal markets similar to that from a short U.S. soybean crop. With a recent sharp weakening of the U.S. dollar, further modest growth in the U.S. bean and meal exports to EC seems likely in the next few years,[37] along with potential growth in exports to Eastern Europe and USSR. However, growth rates appear likely to remain well below those of the 1970s because of slower growth in the world economy, continued debt problems in developing nations including Eastern Europe, and increased EC wheat feeding stemming from technological improvements in production of that grain.

In contrast to U.S. soybean meal and soybean exports, major foreign markets for soybean oil consist primarily of developing nations in Asia, Africa, and Latin America. As Figure 47 indicates, U.S. soybean oil exports have been highly variable from year to year for more than two decades. Short-term fluctuations in exports are due largely to changes in production of major competing vegetable oils, animal fats, marine oils, and changes in U.S. soybean oil supplies and prices. The export demand for U.S. soybean oil is highly price inelastic. In other words, large changes in prices are needed to bring significant increases or decreases in exports, provided all other market influences remain unchanged. For example, U.S. soybean oil exports dropped sharply in 1983-84, not because of reduced demand, but primarily due to drought-reduced U.S. soybean supplies, limited availability of U.S. soybean oil for export, a sharp rise in soybean oil prices, and the rationing effect on exports resulting from the higher prices. To bring about the required sharp decline in U.S. exports, soybean oil prices in late 1983 and early 1984 rose more than 50 percent above the average level of recent years. The strong dollar and debt burdens of developing nations were other factors tending to reduce 1983-84 soybean oil exports. However, with a high percentage of U.S. soybean oil exports being shipped under

Figure 47. U.S. Soybean Oil Exports by Destination, October-September 1964-65 to 1986-87.



Note: 1986-87 exports are projected using the October 1986-March 1987 percentage change from a year earlier.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseed and Products* (Washington, D.C.), various issues, U.S. export sales April 3, 1986, and April 2, 1987.

government financing programs, these factors appear to have been less significant than in grain and soybean exports.

Exports of U.S. soybean oil in the first half of the 1986-87 fiscal year were well below the previous season's depressed level and at an annual rate less than half the peak level of 1981-82. Exports to India dropped to sharply below previous peak levels as a result of increased competition from domestic oilseeds and Malaysian palm oil. U.S. soybean oil exports to Pakistan and Africa in the first half of 1986-87 also dropped well below a year earlier, along with substantial declines in exports to most other destinations. The long-term upward trend in Malaysian palm oil production was temporarily interrupted in late 1983 and the first few months of 1984 as a result of dry weather and stress on trees from the introduction of a weevil to aid in pollination. Palm oil production then resumed its long-term upward trend from mid-1984 through mid-1986, with that trend again being interrupted in late 1986 and early 1987. While weather can influence short-run palm oil production trends considerably, expanded tree plantings in major producing areas in recent years are likely to create a long-term upward trend in palm oil supplies.[12]

World fat and oil supplies also were tightened in 1983-84 by an unusually small 1983 U.S. cottonseed crop (down 35 percent from 1982 and down 51 percent from 1981), a resulting decline in U.S. cottonseed oil supplies, and by cyclically reduced olive oil production in Mediterranean countries. These developments brought a sizable decline in visible and invisible (unreported) world fat and oil inventories by late 1984. With inventories at minimal levels, global soybean oil trade patterns in the 1984-85 trade year reflected efforts by the world vegetable oil trade to replenish stocks to a more normal level. Stock-rebuilding efforts helped to maintain 1984-85 soybean oil prices well above levels of the late 1970s and early 1980s despite increased U.S. and global oilseed and vegetable oil production.

However, an abrupt change in the global soybean oil situation occurred in 1985-86 and continued into 1986-87. With substantially increased U.S. soybean and Malaysian palm oil production, global soybean and vegetable oil stocks rose sharply in the October-September 1985-86 trade year and continued at above normal levels in 1986-87. Rising stocks pushed soybean oil prices sharply below average levels of the previous five years and contributed to depressed world soybean prices during the first half of the marketing year. Early indications are that world palm oil and soybean oil supplies will remain relatively large in the year ahead, but may permit a modest reduction in global stocks and a slight to modest increase in U.S. soybean oil prices and exports.

In examining prospects for U.S. soybean oil exports for the late 1980s and early 1990s, Figure 47 shows a modest long-term upward trend in exports despite large year-to-year fluctuations. The upward trend reflects an annual population growth of over 2 percent in most developing nations. In addition, per capita fat and oil consumption in these countries is moderately sensitive to changes in per capita incomes. The long-term upward trend of population and incomes in developing countries appears likely to push U.S. soybean oil exports irregularly higher in the years ahead. In contrast, per capita fat and oil consumption in industrialized nations already is large and is expected to increase only slowly. Thus, developing countries are likely to remain the leading export markets for U.S. soybean oil in the years ahead. Since soybean oil competes with a wide range of other fats and oils, large year-to-year fluctuations in U.S. soybean oil exports also are likely to continue in the foreseeable future, due to fluctuations in availability of competing products.

Major products that compete with soybean oil include butter, lard, tallow, sunflowerseed oil, cottonseed oil, rapeseed oil, peanut (groundnut) oil, palm oil, coconut oil, safflower oil, olive oil, and fish oil. In contrast to oilseeds from which many of the competing vegetable oils are produced, soybeans have a relatively low oil content (18 percent) and a relatively high protein meal yield per ton (80 percent). Long-term global demand for soybean meal has grown more rapidly than the demand for soybean oil, partly because of strong dietary shifts toward more meat and poultry consumption as incomes rise in rapidly and moderately developing economies. This has generated long-term growth in demand for livestock and poultry feed ingredients, and relatively slower growth in global demand for fats and oils. Moreover, soybeans have faced strong competition in the oil sector from high-oil content oilseeds, several of which have experienced rapidly expanding production. In the years ahead, indications are that competition from palm oil production and exports will increase significantly and will continue to restrain long-term growth of U.S. soybean oil exports. Tree plantings in major producing regions of Malaysia have been expanded sharply in recent years and may continue to expand through the remainder of this decade. In addition, improved management practices have the potential to increase palm oil production per hectare significantly in the years ahead.

These forces, from the viewpoint of the U.S. soybean industry, suggest a need for continued priority on market development for soybean oil in developing nations, as well as development of new products from soybean oil. The unusually tight U.S. and world soybean oil supplies of 1983-84 and 1984-85 were a temporary development, although adverse weather conditions in major foreign and U.S. producing regions can be expected to bring short-term reoccurrences of that situation from time to time.

U.S. Wheat Exports by Destination

Figure 48 reveals substantial changes in destinations of U.S. wheat exports since the late 1970s, with the changes becoming even more dramatic in the 1986-87 fiscal year. The three most pronounced changes were an abrupt decline in Chinese purchases of U.S. wheat starting in 1984-85, a sharp drop in exports to USSR in 1985-86 with a small recovery in 1986-87, and the rapid growth of Africa and the Middle East as markets for U.S. wheat. Rapidly expanding U.S. wheat exports to the Middle East and North Africa reflect heavy targeting of U.S. Export Enhancement Programs to that area in 1986-87. At the same time, Europe has reduced its imports of U.S. wheat substantially in recent years. Reduced European imports reflect substantially increased wheat production in that area. While Europe is now a net exporter of wheat, much of its crop consists of soft wheat varieties. The U.S. continues to export some hard wheat and durum wheat to Western Europe to meet its needs for these wheats.

In addition to these trends, U.S. wheat exports to Latin American nations have continued their long-run upward trend, with the Western Hemisphere and Africa together accounting for about half of all U.S. wheat exports in the 1986-87 fiscal year. Exports to India dropped to zero in 1985-86 and 1986-87 as a result of that nation's increased domestic production, large carryover stocks, and its internal pressure to export wheat.

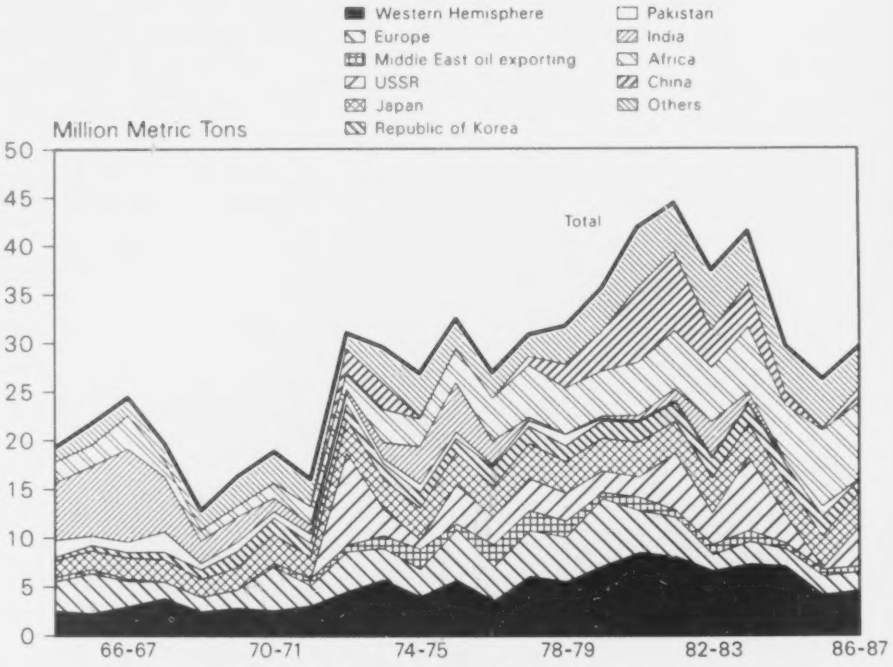
After a temporary upturn in U.S. wheat exports in fiscal 1983-84, exports turned downward in the next two years, but in 1986-87 are expected to increase modestly.

espite the increase, 1986-87 U.S. wheat xports are expected to be 42 percent elow the peak level of 1981-82. Export ends in the next few years will depend omewhat on the success of the U.S. xport Payment-in-Kind (Export PIK) pro- ram announced in mid-1985 and used ggressively in 1986-87, as well as foreign roduction trends, continued global popula- on growth and expected modest world conomic growth. Export PIK is intended to eet subsidized competition from other heat exporters, and is expected to be iven continued strong emphasis in 987-88. Depending on responses of other xporters, it may set the stage for at least ight additional growth in U.S. wheat xports in the late 1980s and early 1990s. owever, technological developments in heat production in India, China, and the uropean Community appear to be irrevers- le and likely will generate continued rong competition in world wheat export arkets in the next few years. Large upplies in these nations may be moder- ted slightly by shifts of some marginal nd away from wheat production in anada, Argentina, and Australia in re- ponse to depressed world wheat prices. ow prices may also encourage some duction in fertilizer application rates on heat in non-EC countries, and in that way ay tend to slow the upward trend in wheat elds in the next few years.

gure 48 also reveals large year-to-year ariations in U.S. wheat exports during the ast two decades. This variability is likely to ontinue in future years and will contribute significant year-to-year changes in U.S. nd world wheat prices. Variability of U.S. xports is related partly to fluctuating roduction in four important areas. India, hina, USSR, and Australia. The first three re populous nations with a history of ubstantial variations in rainfall and tem- eratures from one year to the next. Their nport requirements are inversely related to e size of domestic production.

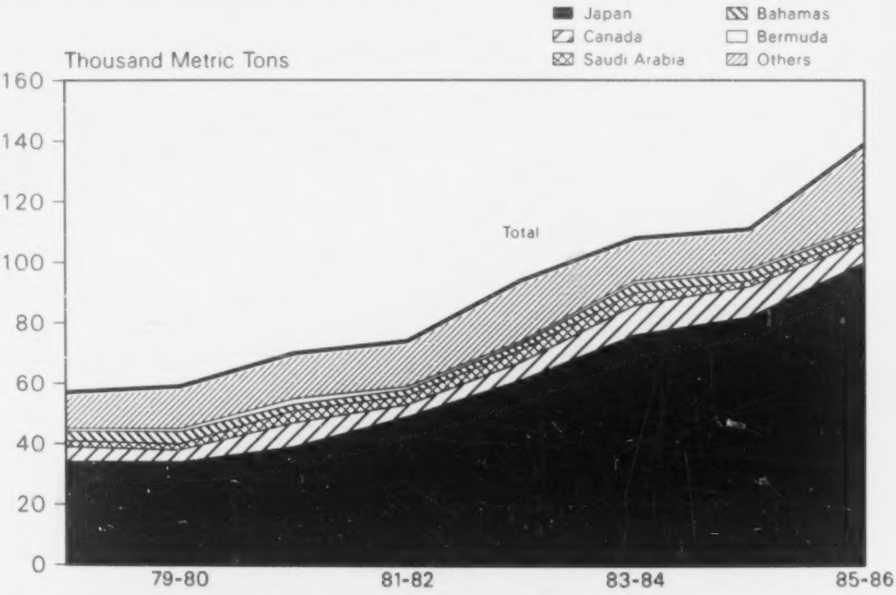
ustralia has a highly variable climate, is inly populated, and is a major exporter of heat. When its weather is favorable for heat production, the U.S. tends to face creased competition in world wheat mar- ets. In contrast to the U.S., Australia and ther wheat exporting nations have not eveloped a policy of accumulating reserve ocks when production is large. As a esult, marketing policies of other exporting ations often leave the U.S. as a residual upplier to world markets. When world upplies are large and world prices are low, e U.S. traditionally accumulates reserve

Figure 48. U.S. Wheat Exports by Destination, October-September 1964-65 to 1986-87.



Note: 1986-87 exports are projected using the October 1986-March 1987 percentage change from a year earlier.
Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues, and *Grain Market News* (Independence, Mo.), various issues.

Figure 49. U.S. Beef and Veal Exports by Major Destinations, 1977-78 through 1985-86 October-September Fiscal Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the United States* (Washington, D.C.), November-December 1986 and various other issues.

stocks to support prices. Conversely, when world grain supplies are reduced, U.S. policies encourage these reserve stocks to be utilized to fill the supply-gap resulting from reduced foreign crops. With the dramatic changes in U.S. price support and reserve policies spelled out in the Food Security Act of 1985, the U.S. role as a residual supplier and holder of reserve stocks appears to be changing and may change further in the years ahead.

Trends in U.S. Red Meat and Poultry Exports by Destination

The major export markets for U.S. beef are Japan and Canada and, beginning in 1985-86, Brazil (Figure 49). Japan now accounts for nearly three-fourths of all U.S. beef exports, with an additional 5 percent being exported to Canada and 11 percent to Brazil in 1985-86. The Japanese market for U.S. beef has grown substantially since the mid-1970s, partly in response to pressures from the U.S. government to ease its import restrictions. On a tonnage basis, total U.S. beef exports are now slightly over three and one-third times as large as in 1976-77, with much of the growth due to the increased Japanese purchases.

Future growth in U.S. beef exports will depend strongly on trade negotiations to ease import barriers in Japan, as well as other nations. While some easing of such restrictions is likely, major changes in foreign nations' beef importing policies should not be expected in the near future. Foreign beef producers are extremely sensitive to changes in import policies that would increase supplies and depress prices for their products. In Japan, as well as several other beef importing nations, agricultural producers have substantial political influence. Resistance of foreign producers to easing of trade barriers will likely continue as a restraining influence on U.S. beef exports although some further growth appears likely in the years ahead.

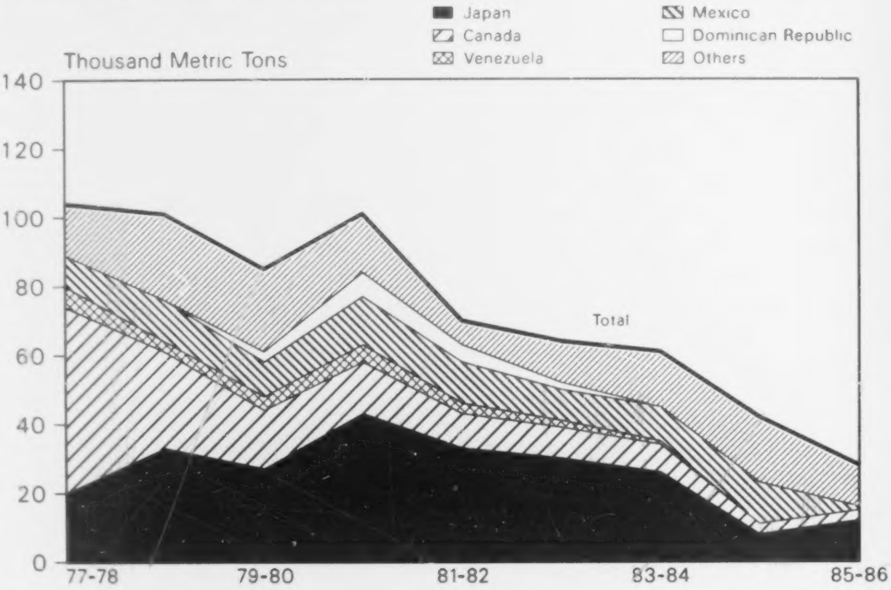
Major destinations for U.S. pork exports include Japan, Mexico, and Canada, as shown in Figure 50. Pork exports from the U.S. to Canada have shown a major downtrend from the late 1970s through 1985-86, partly as a result of the strong U.S. dollar relative to the Canadian currency, which discourages U.S. exports. With declining exports to Mexico, EC, and Canada, U.S. pork exports, on a tonnage basis in 1985-86, were only about one-fifth as large as in 1975-76. Declining U.S. pork exports also reflect the slow growth of the world economy and strong competition from pork exporting nations in Western and Eastern Europe. With declining exports since the mid-1970s, future U.S. pork export prospects are uncertain. However, a weaker U.S. dollar and slightly accelerated world economic growth may help to stabilize or slightly increase export demand for U.S. pork in the late 1980s and early 1990s.

In contrast to beef and pork exports, edible offals and variety meats exhibited a slight upward trend since the mid-1970s (see Figure 51). Major destinations for exports of these products include Western European nations, Japan, Mexico, Canada, and Egypt. In the last eight years, Egypt has emerged as a significant new growth market for U.S. edible offals and variety meats. By 1985-86, it accounted for 11 percent of all U.S. exports of these products and ranked fifth in size of purchases, behind Mexico, Japan, France, and United Kingdom.

U.S. poultry meat exports also have been in a sharp downward trend in the last few years until 1985-86, as shown in Figure 52. Exports of these products in dollar value in fiscal 1985-86 were about 34 percent less than in 1980-81. Declining poultry meat exports reflect subsidized competition from EC and Brazil, as well as adverse effects from the strong U.S. dollar during the 1981-85 period and sluggish world economic growth. Much of the decline was accounted for by reduced exports to Iraq, Egypt, Venezuela, and several countries in the Other category in Figure 52. Growth in U.S. poultry meat exports to southeast and eastern Asian markets, including Japan, offset a small part of the decline in exports to other areas during the 1980-81 to 1985-86 period.

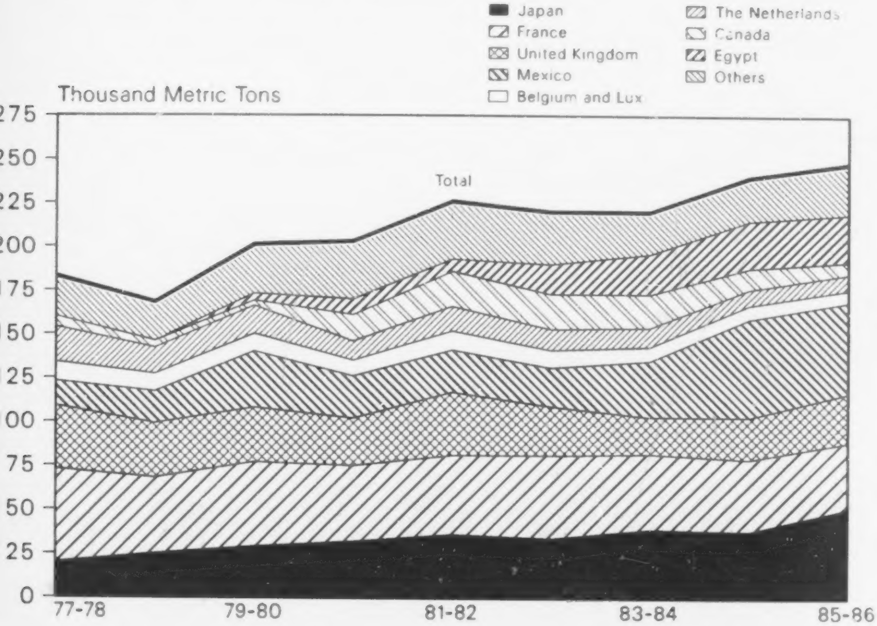
Expanded U.S. poultry meat exports in 1985-86 were concentrated largely in shipments to Western Europe and Japan, due partly to a weak U.S. dollar relative to currencies of these nations. Increased exports to these nations pushed the value of 1985-86 U.S. poultry meat exports 16 percent above a year earlier. The future of U.S. poultry meat exports will depend heavily on the exchange rate of the U.S. dollar, and the strength and timing of changes in world economic growth.

Figure 50. U.S. Pork Exports by Major Destinations, 1977-78 through 1985-86 October-September Fiscal Years.



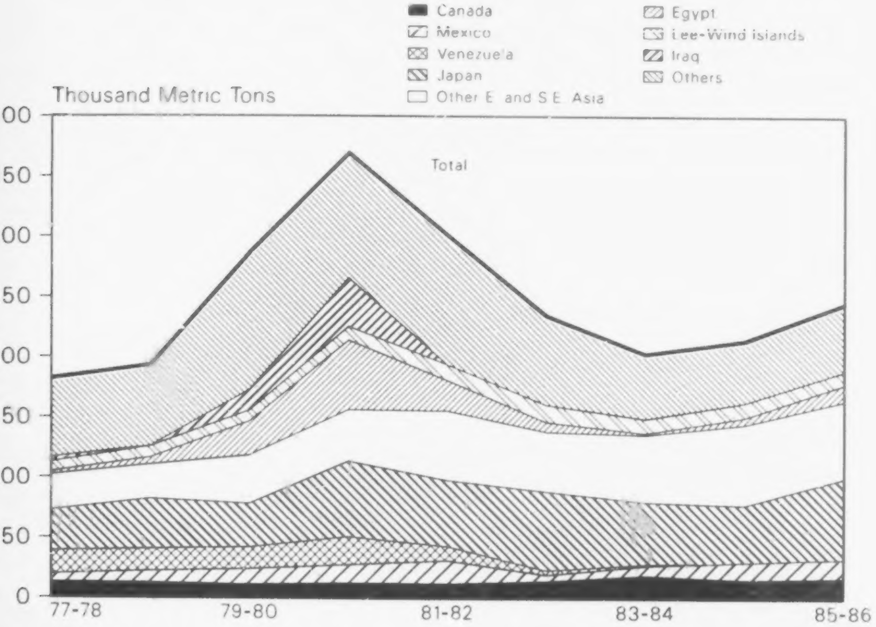
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the United States* (Washington, D.C.), November-December 1986 and various other issues.

Figure 51. U.S. Exports of Edible Offals and Variety Meats by Major Destinations, 977-78 through 1985-86 October-September Fiscal Years.



ource: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the nited States* (Washington, D.C.), November-December 1986 and various other issues.

igure 52. U.S. Fresh and Frozen Chicken and Turkey Exports by Major estinations, 1977-78 through 1985-86 October-September Fiscal Years.



ource: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the nited States* (Washington, D.C.), November-December 1986 and various other issues.

U.S. Price Support Levels Continue to Decline[39]

After debating nearly six months on ways to improve the U.S. agriculture position in world markets, the U.S. Congress in December 1985 passed complex new farm legislation that allowed sharply lower price support levels on major crops in 1986, with additional declines in government price support levels permitted through 1990. The legislation, known as the Food Security Act of 1985, continues a twofold approach for income support to U.S. producers of major crops that has been used in recent years. Target prices are a key element of this support system. These are used to determine the amount of deficiency payments or direct payments to farmers participating in acreage reduction programs if market prices during a specified time period are below target levels. Target prices for major U.S. crops were frozen at 1984-85 levels through the 1986-87 marketing year, after which they are scheduled to decline gradually to the end of the decade.

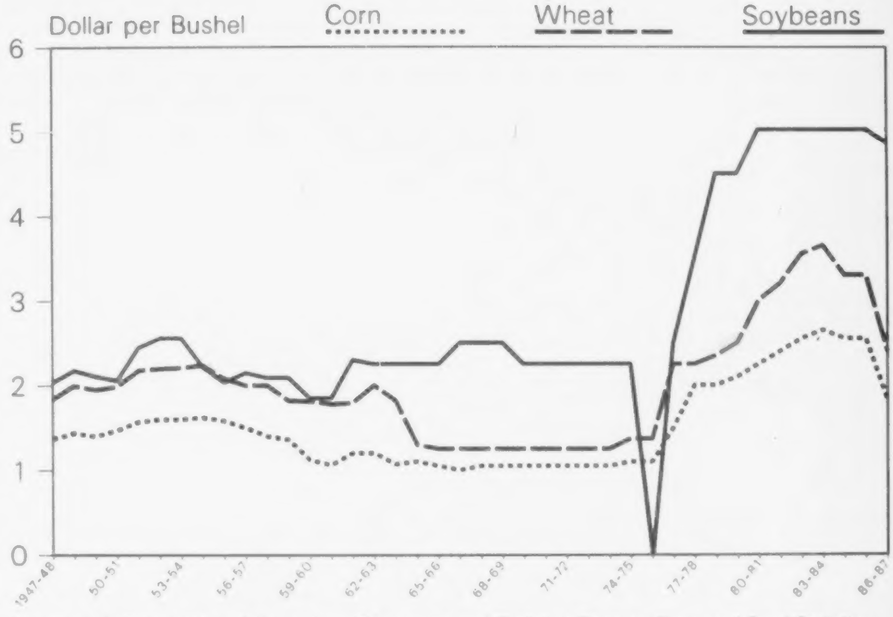
The other major components of the U.S. price support system are the loan rates that date back more than 50 years to when U.S. price support systems originated. Farmers participating in government programs may store their crops beyond harvest and receive a government loan at the designated loan rate per bushel. These loans have a nine-month maturity. At any time during this period, the farmer may repay the loan plus accumulated interest and sell or use the grain. As an alternative that often is used when cash prices are below the loan rate, the farmer may deliver the grain (or other crops) to the government in fulfillment of the loan. In this case, principal and interest on the loan need not be repaid. This process is known as forfeiture of price support loans and is the primary mechanism that increases grain stocks owned by Commodity Credit Corporation (CCC), an agency of the U.S. government. Loan rates vary from county to county across the U.S., due to differences in transportation costs from local producing areas to major export markets. There are thousands of counties in the U.S., each of which has a local office to administer price support programs. For example, Iowa—the leading corn producing state in the U.S.—has 99 counties and corn loan rates that vary by approximately $.12 to $.14 per bushel from the highest to the lowest level.

Corn Loan Rates Down

The Food Security Act of 1985 provides much more discretionary authority to the Secretary of Agriculture in setting crop loan rates than in the past. For example, the 1986 crop average U.S. loan rate for corn was set at a statutory minimum level of $2.40 per bushel, down from $2.55 on the 1985 crop. However, the agriculture secretary is required to reduce this by at least 10 percent and can reduce it by as much as 20 percent if the U.S. average price received by farmers in the previous year was not more than 110 percent of the loan rate. This adjustment is required for the 1986 corn loan rate since market prices for the previous year's crop were depressed. The agriculture secretary chose to set the 1986 loan rate at the lowest allowable level, $1.92 per bushel, down $.63 from the previous year. In addition, government agricultural program expenditures were reduced by other legislation including the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Reduction Act which was passed in late 1985. With a 4.3 percent expenditure reduction to decrease the U.S. federal budget deficit, this lowered the effective 1986 U.S. corn loan rate by an additional $.08 per bushel. The effective loan rate for 1987-crop U.S. corn has been lowered by an additional 2 cents per bushel, to $1.82 per bushel ($71.66 per metric ton).

For the 1988 through 1990 corn crops under current U.S. laws, the statutory loan will be 75 to 85 percent of the immediately preceding five-year average price received by farmers, excluding high and low years and with a provision that loan rates cannot be reduced more than 5 percent from the preceding crop year in any one year. These adjustments could reduce the nominal loan rate for U.S. corn to as low as $1.56 per bushel ($61.50 per metric ton) in 1990, provided world grain prices do not increase sharply from recent levels in 1987-89.[40] In addition, the effective loan rate for 1988 through 1990 crops could be reduced from the nominal level by still to be determined amounts resulting from the Gramm-Rudman-Hollings act. Even more flexibility in U.S. price support levels is provided by authorization of the Secretary of Agriculture to use marketing loans or loan deficiency payments if necessary to compete effectively in world markets. Marketing loans would allow producers to repay their price support loans at the higher of either the market price or 70 percent of their loan rate if market prices are below the loan. Loan

Figure 53. U.S. Corn, Wheat, and Soybean Price Support Loan Rates, 1947-48 to 1986-87.



Source: U.S. Department of Agriculture, Economics and Statistics Service, *Grain and Feed Statistics through 1961*, Statistical Bulletin No. 159 (Washington, D.C.), revised June 1962. USDA-EES, *Feed Situation*, FDS 228, April 1969; FDS 231, November 1969; FDS 241, November 1971; FDS 246, November 1972; FDS 260, February 1976; FDS 264, February 1977; FDS 268, February 1978; FDS 272, February 1979. USDA, Economic Research Service, *Feed Outlook and Situation*, FDS 282, August 1981; FDS 286, August 1982; FDS 292, March 1984; FDS 295, November 1984; FDS 299, March 1986. USDA-ERS, *Wheat Outlook and Situation Yearbook*, WS 277, February 1987. USDA, Agricultural Marketing Service, *Background for 1985 Farm Legislation*, Agricultural Information Bulletin No. 472, 1985.

deficiency payments would provide direct cash payments to producers to compensate for cash prices that are below the loan rate, if the producer chooses to forego use of the government loan program. Payment-in-Commodity (PIC) certificates provided by the 1985 U.S. Food Security Act are currently being used as an alternative to sharply reduce U.S. feed grain prices and enhance the U.S. competitive position in world markets.

These tools, if implemented, will continue to keep the effective U.S. market price support levels well below the average of the 1979-85 period. They are a clear signal that the U.S. Congress is serious about increasing the competitiveness of U.S. agricultural exports and in halting the rapid decline in U.S. shares of world exports. Implementation of these drastic changes in U.S. support mechanisms has far-reaching implications for farmers in other grain exporting nations, grain exporting firms, other international agribusiness industries, and costs of government agricultural programs in the U.S. and other nations. The U.S. price support programs traditionally have provided downside support to world prices, with foreign exporters tending at times to price their products slightly below U.S. levels if necessary to clear the market and avoid sharply increased carryover stocks. The Food Security Act of 1985 is a signal to other exporting nations that they must either share the burden of matching market-available supplies with effective demand, or pay a penalty in the form of very depressed prices resulting from the lower U.S. loan rates as the U.S. deviates from its traditional role as residual supplier. As an indication of how the U.S. administration and Congress view this new flexibility in setting support levels, in the spring of 1986, this newly acquired authority was used fully on two crops by implementing marketing loans on 1986-crop cotton and rice.

Loan Rates for Other Crops Also Lowered

Loan rates for other grains are established through formulas similar to those for corn. For example, the nominal U.S. average loan rate for 1986-crop wheat was reduced to $2.40 per bushel ($88.30 per metric ton), down $.90 per bushel from the 1985 level. Gramm-Rudman-Hollings cuts made the effective loan rate $1 per bushel ($36.80 per metric ton) below the comparable level for the 1985 crop. The effective 1987 loan rate was reduced further, to $2.28 per bushel ($83.90 per metric ton). With depressed prices in the 1988-89 period, the 1990 nominal loan rate could decline to as low as $1.95 per bushel ($71.66 per metric ton).[41] The effective loan rate could, under certain conditions, be reduced even more through Gramm-Rudman-Hollings cuts or by implementation of marketing loans or loan deficiency payments.

The 1986 and 1987 average soybean loan rates by law may be no higher than $5.02 per bushel, the same as in 1985. However, if the agriculture secretary determines that these levels discourage exports, the loan rate can be reduced by up to 5 percent per year, with a minimum lower level of $4.50 per bushel. The 5 percent reduction lowered the 1986 loan rate to $4.77 per bushel ($175.30 per metric ton), with the effective loan rate being reduced to $4.56 per bushel ($167.58 per metric ton because of Gramm-Rudman-Hollings cuts. For 1988 through 1990 crops, the loan rate is scheduled to be 75 percent of the immediately preceding five-year average price received by farmers, excluding the high and low years, with a $4.50 per bushel minimum level and a constraint that the loan rate for any individual year may not be reduced more than 5 percent from the previous year. However, in early 1987, Congress and the U.S. Administration were seriously considering new legislation that would permit a larger reduction in the U.S. soybean loan rate for 1987 through 1990 crops. Loan rates for other feed grains are based on formulas similar to those for corn.[42]

U.S. Target Prices to Decline in 1988-90

While loan rates are the main price support mechanism in U.S. farm programs for most major crops, income support for producers is linked more directly to target prices. For 1987 crop corn, producers participating in the government acreage control program will be eligible for deficiency payments to make up some or all of the difference between the target price and the market price if prices received by farmers are below the target price. Maximum deficiency payments for this year's corn crop will be $1.21 per bushel, the difference between the loan rate of $1.82 and the target price of $3.03 per bushel. With market prices above the loan rate, participating farmers would be paid only the difference between the market price and the target price. Participating farmers would receive the maximum deficiency payment rate on normal production on area planted to corn if average U.S. farm market prices for the September 1987-August 1988 corn marketing year are at or below the $1.82 loan rate. Part of these payments will be made in cash and part will be in commodity certificates. In addition, payments on the first $.73 per bushel of the corn deficiency payment ($3.03 target price minus $2.30 statutory loan) are subject to a $50,000 payment limit per farmer to avoid unduly large benefits to large farms.

Target prices per bushel for corn for 1988 through 1990 crops are scheduled to be as follows: 1988, $2.97; 1989, $2.88; and 1990, $2.75. For wheat, the target prices established in the Food Security Act of 1985 were $4.38 per bushel for 1986 and 1987 crops, $4.29 for the 1988 crops, $4.16 for the 1989 crop and $4.00 per bushel for the 1990 crop. These target prices provide maximum wheat deficiency payments of $2.10 per bushel ($77.18 per metric ton) on the 1987 crop. As with corn and other feed grains, a $50,000 payment limitation applies per farmer, with some exceptions. At this writing, U.S. soybeans have no target prices and consequently no direct government payments are available for production of soybeans.[43]

Supply-Control Provisions[44]

For half a century, the U.S. has taken on most or all of the role of supply management in world grain markets in times of surplus U.S. and world production. The Food Security Act of 1985 provides for a continuation of that role if sharply lower price support levels fail to generate enough additional domestic and export demand to reduce carryover stocks substantially. For corn and other feed grains, producers will be required to idle from 12.5 to 20 percent of their feed grain base acre to obtain program benefits, if U.S. carryover stocks are over 2.0 billion bushels. With carryover stocks at or below 2.0 billion bushels, not more than 12.5 percent of an individual farm's feed grain base area would need to be idled to qualify for program benefits. For wheat, land-idling requirements for participation range from 15 to 30 percent of a producer's base area when old-crop U.S. wheat carryover stocks exceed 1.0 billion bushels. Maximum land-idling requirements are 15 percent of the base when carryover stocks drop to or below 1.0 billion bushels. As has traditionally been the case, U.S. soybeans have no land-idling provisions.

In addition to land-idling features in individual commodity programs, the Food Security Act of 1985 provides for a long-term program designed to idle up to 40 to 45 million acres (18.2 million hectares) of erosion-prone cropland for 10 years. The 40 to 45 million acre goal is intended to be reached by 1990 and would represent 11 to

12 percent of all U.S. cropland. Land idled under this program must be planted to trees or grass, and mechanical harvesting of these products is forbidden during the life of the contract. Land being idled under this program is well below average in productivity, since it represents steeper sloping fields and those in less humid areas that are subject to wind erosion. A sizable part of the land idled under the long-term program is coming from wheat, small grains, and soybean production. Through late spring of 1987, U.S. farmers had enrolled approximately 20 million acres (8.1 million hectares) in this program. The 1985 farm act also contains "sodbuster" and "swampbuster" provisions, which provide that farmers bringing such land into production will be ineligible for government price support programs.

Along with these features, wheat legislation provided authority for the U.S. Secretary of Agriculture to implement strict marketing quotas and much higher price support levels, if 60 percent or more of U.S. wheat growers approved such a plan in a referendum. Marketing quotas in that case would have come into effect as an alternative to the price support and land idling programs outlined above. To have been implemented, the quotas would have required approval by a referendum by August 31, 1986. In a July 1986, referendum, however, U.S. wheat growers did not provide the required percentage approval to implement such controls.

Grain Reserve Programs[45]

In the early 1980s, the Farmer-Owned Grain Reserve Program was a key supply management tool in U.S. farm policies. When supplies exceeded market demand, farmers were paid to continue storing grain for three to five years and were permitted to sell such grain only if prices rose sharply or if the grain was deteriorating in quality. The reserve program remains in effect for the years immediately ahead. However, late 1985 legislation directs the Secretary of Agriculture to establish upper limits on the amount of wheat in the reserve at 30 percent of estimated total annual domestic and export usage, with the standard upper limit on feed grain reserve stocks at 15 percent of total annual domestic usage. Higher reserves equal to 110 percent of these levels can be established at the secretary's discretion. Maximum limits on reserve stocks became effective in the 1986-87 marketing year, and prevented entry of 1986 crops into the reserve.

Implications for U.S. and World Agriculture

The 1985 Food Security Act is a complex piece of legislation that could conceivably be modified by Congress in 1987 or 1988, but is likely to provide the overall direction for U.S. farm policy until the end of the decade. It signals a shift in U.S. price support programs somewhat in the direction of EC support system, with domestic crop incomes to producers being supported well above world levels through the target price system. However, one important difference from EC grain price support system is that U.S. farmers are required to idle a substantial part of their cropland to qualify for price and income supports. These policy changes exerted sharp downward pressure on U.S. and world grain prices in 1986-87 and possibly could maintain that pressure until the end of the decade, given average or better grain yields in the U.S. and other major producing areas. Low prices should reduce incentives for increased production in the U.S. as well as in other exporting nations, and also will tend to increase grain utilization by making livestock and poultry products affordable to a larger segment of the developing world. With time lags of one to three years, these developments should begin to move grain production and utilization toward equilibrium levels. However, in the next year or two, U.S. and world grain stocks could continue at relatively high levels.

Reduced U.S. price support levels have sharply reduced grain prices received by farmers in such exporting nations as Canada, Argentina, Brazil, Australia, South Africa, and Thailand. In countries whose domestic agricultural programs support prices well above world levels, such as the EC nations, government expenditures for farm programs have risen sharply, and political pressure may shift in the direction of lower agricultural price supports or possibly toward cropland idling programs. In importing nations, the lower prices are advantageous for domestic consumers in the short run, but will work against incentives for increased self-sufficiency in agricultural products in the longer run. In addition, the lower level of world prices has increased temptations of the U.S. and other nations to follow protectionist trade practices such as import restrictions to shield domestic producers from foreign competition. For example, Canada in 1987 implemented an import tax of 84.9 U.S. cents per bushel of U.S. corn to protect Canadian corn producers.

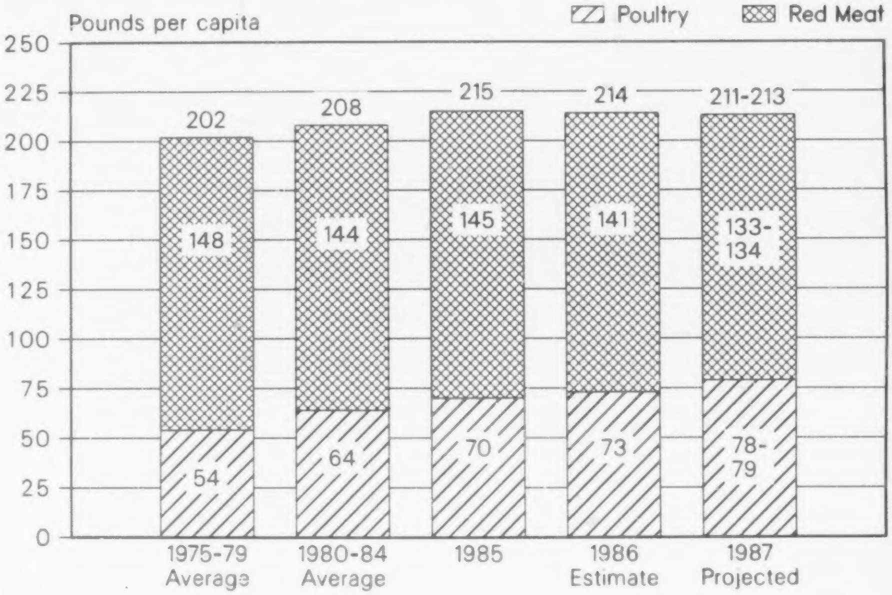
Until world utilization responds substantially to lower farm product price levels, a danger of increased trade subsidy wars in agricultural exports also will continue. The most likely candidates for increased trade wars are the U.S., Japan and the EC. In case of progressively larger export subsidies and import restrictions, world prices likely would face increased downward pressure and would tend to worsen the already difficult plight of farmers in nations not protected by government income support payments. With these potential adverse affects, caution will likely be used in implementing some of the U.S. policy tools provided in the U.S. Food Security Act of 1985. Included in this category are export subsidies, Export Payment-in-Kind programs, marketing loans, and loan deficiency payments.

U.S. Meat Consumption Shifts Toward Poultry

In the last decade, a major change has been occurring in U.S. meat consumption, with consumers reducing consumption of red meat (beef and pork) and dramatically increasing consumption of poultry (chicken and turkey) meat.[46] These trends are shown in Figure 54 and reflect a number of influences including a desire among consumers to reduce intake of fat and cholesterol, thus reducing the risk of cardiovascular disease, which is the leading cause of death in the U.S. In addition, many new products have been developed by the poultry industry and marketed through fast-food restaurants. The industry also has developed convenience products portioned and packaged for quick preparation at home to meet needs stemming from sharply increased employment of women in the labor force. In this area, innovations in the poultry industry appear to have substantially outpaced the red meat industry. The rapid adoption of microwave cooking units in American homes may also have contributed to this trend, since poultry products in some cases may be more suited for microwave cooking.

This trend is expected to continue in the next few years, and may also be reflected in other industrialized nations. If so, it may have important implications for grain producers, handlers, and exporters. Poultry production requires much less grain per pound of meat produced than pork and grain-fed beef such as that produced in the U.S. As a result, it has been possible for U.S. agriculture to supply domestic consumers with slightly more meat in 1986-87 than a decade ago, with slightly less grain being required for meat production. In other words, the trend toward poultry production has released a modest additional amount of U.S. grain for export or other uses in recent years. Similar trends in other areas such as Western Europe, Canada, and USSR could slightly increase world availability of grain for export and slightly restrain the growth in global grain trade from levels that otherwise would exist without changes in meat consumption patterns. In addition, these trends have important implications for the red meat industry in areas of product innovations, pressures to increase feed conversion efficiency and productivity, investment prospects in industries producing inputs used in livestock production, and in livestock marketing and processing industries.

Figure 54. U.S. Per Capita Meat Consumption.



Source: U.S. Department of Agriculture, Economic Research Service, *Outlook '87* charts, 63rd Annual Agricultural Outlook Conference, Washington, D.C. December 1986, p. 12

Update on European Community

Spain and Portugal on January 1, 1986, joined EC after eight years of negotiation. This is the third enlargement of EC since the original six member states were joined together in 1958. An additional enlargement is possible at some future time, since Turkey is expected to apply for admission to EC in 1988. Spain and Portugal's admission to EC has given those two countries access to an enlarged home market of approximately 320 million consumers. And the enlarged EC should enhance the political and military stability of Western Europe. Over time, their adjustment to EC agricultural policies appears likely to increase the two nations' demand for soybeans and protein meal, but already is believed to be having some negative impact on U.S. grain exports.

Entrance to EC requires Spain and Portugal to adopt the community's common agricultural policy (CAP) by gradually harmonizing their agricultural policies with the CAP during an extended transition period that began January 1, 1986. Adoption of CAP will lead to changes in relative prices, production, and consumption of some agricultural products in the two countries, which is the source of the expected changes in trade patterns.

Spain's Agriculture and Trade[47]

Preliminary data place Spain's average annual imports of all products during the 1981-83 period at $30.8 billion, with 12.5 percent of the total being agricultural products. Nearly one-fourth of its agricultural imports have been cereals, and nearly 95 percent of the cereals were feed grains. Oilseed, oil nut, and oil kernel imports accounted for another 22 percent of the country's agricultural imports, with 95 percent of these products being soybeans. Historically, Spain has been an importer of U.S. corn, soybeans, barley, sorghum, and soybean meal for several years. Its demand for U.S. corn reached a peak at the turn of the decade, then declined sharply from 1981-82 through 1984-85, as its crops recovered from severe drought and a strong U.S. dollar discouraged imports. Annual U.S. corn exports to Spain totaled 99 million bushels in 1979-80, but had declined to only 40 million bushels by 1984-85. U.S. soybean, soybean meal, and sorghum exports to Spain followed a similar pattern of gradual decline from 1981-82 to 1984-85. Spain's U.S. soybean imports totaled 114 million bushels in 1981-82 but dropped to almost zero in 1984-85.

Average annual Spanish exports during the 1981-83 period were $20.1 billion, with 16 percent of the total composed of agricultural products. The nation's export of fruits, vegetables, wine, and beverages accounted for 77 percent of its agricultural export trade.

Spanish agricultural production increased at an average annual rate of 4 percent from 1960 to 1978, with livestock production increasing more rapidly than crops. Because of rapid growth in its livestock production, Spain now is almost self-sufficient in pork, poultry, and beef and is an exporter of eggs. It also has surplus production of olive oil, fruits, and vegetables. Some sources estimate Spain's entrance to EC will raise the community's output of vegetables by 25 percent, fresh fruit output by 48 percent, and olive oil production by 59 percent.[48] However, Spain's net import position in corn, sorghum, and oilseeds has reduced the enlarged EC's self-sufficiency levels in these products.

A first step in Spain's transition to EC policies was a replacement of the country's fixed 20 percent import duty on grains with the community's variable levy. This change became effective March 1, 1986,[49] and has tended to increase domestic grain prices by 11 to 15 percent[50] from pre-EC levels. Over time, higher prices will tend to encourage grain production, discourage grain feeding, and encourage the use of grain substitutes such as soybean meal, manioc or cassava, corn gluten feed, and grain milling byproducts. Expanded utilization of these products likely will reduce Spain's imports of U.S. corn, but could increase its soybean imports.

Portugal's Agriculture

Portugal's imports of farm and nonfarm products in the 1981-83 period averaged $9.2 billion annually, with 17 percent of the total being agricultural imports. Cereals, oilseeds, oil nuts, and oil kernels accounted for just over half of its agricultural imports. Its imported cereals were primarily coarse grains, along with slightly over half of its oilseed, oil nut, and oil kernel imports being soybeans. Portugal is an important market for U.S. corn, sorghum, and soybeans. During the 1981-84 period, U.S. corn exports to Portugal accounted for 3 to 5 percent of total U.S. corn exports.

Over this same time period, Portuguese agricultural product exports accounted for 9.9 percent of its total average annual exports of $4.3 billion. Beverage exports comprised 46 percent of its agricultural exports, with nearly all beverage shipments being wine. Fruit and vegetables accounted for another 22 percent of its agricultural product exports.

As part of the EC entrance agreement, Portugal agreed to reserve 15 percent of its grain import purchases for EC beginning March 1, 1986, and continuing through the initial transition period.[51]

As in Spain, Portugal's adjustment to EC variable levy system on grains began on March 1, 1986, and will raise domestic grain prices substantially. Over the longer run, the change will likely encourage increased production and reduced consumption of grains, along with increased use of protein meal and other cereal substitutes. In addition, the requirement that Portugal reserve 15 percent of its grain imports for EC grain could reduce its imports of U.S. corn and wheat by approximately 10 and 3 million bushels, respectively. These reductions would be the equivalent of 0.7 and 0.3 percent respectively of 1985-86 total U.S. exports to all destinations. Potential positive impacts on Portuguese soybean imports also are clouded by a 50,000 metric ton quota on that nation's soybean oil consumption, reportedly being imposed to protect olive producers. That is the oil equivalent of approximately one-half of Portugal's recent annual imports of U.S. soybeans. However, with a quota only on domestic consumption, soybean imports could exceed this level and be processed to meet meal demand, with the excess soybean oil supplies exported.

Increased U.S.-EC Trade Tensions

U.S.-EC Trade tensions increased sharply in 1986-87, partly because of potential negative impacts of the EC enlargement on U.S. grain exports. Other developments contributing to trade tensions included continuing large excess grain supplies in both U.S. and EC, EC's shift to exports of maize (corn) to third countries, a threatened EC tax on vegetable oils, sharply expanded EC oilseed production (noted in the oilseeds section of this report), growing EC and U.S. costs of farm programs, and a continued large U.S. nonagricultural trade deficit with EC nations. After threats and counter-threats that large duties would be placed on imports of key farm products, the two sides reached a temporary reconciliation when EC agreed to expand its grain imports to compensate for Spain and Portugal's entrance to the community.

The four-year U.S.-EC agreement, reached in early February 1987, included EC commitments to permit 2 million metric tons of corn (maize) and 0.3 million tons of sorghum to be imported into Spain annually under reduced levies and elimination of Portugal's requirement to purchase 15 percent of its coarse grain requirements from EC nations.[52] The agreement also included an extension of EC's zero duty on corn gluten feed and soybean meal to Spain and Portugal. However, Spanish imports of grain substitutes such as corn gluten feed, distillers, dried grains, and citrus pellets can be counted toward its allowed quantity of coarse grain imports.[53] Spain and Portugal's imports of these products are likely to increase considerably in the years ahead since import duties and levies are not applied to them. Over the longer term, the agreement likely will not greatly alter changes in Spanish-Portuguese imports from patterns that would otherwise have occurred. In the short-run, it does not provide guaranteed access of U.S. grain to Spain and Portugal, since other non-EC countries can compete for that market. Moreover, it does not prohibit EC from exporting an equal volume of its own coarse grain and wheat to offset required non-EC imports into Spain and Portugal. Thus, the February 1987 agreement is not likely to be a permanent solution to U.S.-EC trade tensions.

Declining Oil Revenues and U.S. Agricultural Exports

From the last quarter of 1985 to the first quarter of 1986, world petroleum prices declined by over 50 percent. Modestly higher prices since then have offset a small part of the decline, but in mid-1987 U.S. and world energy prices remained sharply below the levels of recent years. Declining oil prices have the potential to affect agriculture in both positive and negative directions. On the positive side, energy is a major input in both the agricultural and nonagricultural sectors of the world economy. Its price level affects the cost of producing many major farm inputs, as well as conditioning, processing, and transporting costs of agricultural products. Lower energy costs reduced U.S. and foreign inflation rates in 1986, thus permitting slightly lower interest rates than otherwise would have been possible. The decline in energy costs also has tended to slightly reduce per unit production costs for U.S. farm products, and in that way has been a slightly positive development in the U.S. farm financial crisis.

Lower petroleum prices also are a positive influence on U.S. demand for farm products, as well as on the demand for food and fiber in a large number of oil importing nations. Declining oil prices have provided consumers with additional funds that can be used for dietary improvements, as well as for other purposes. Over time, if current (mid-1987) lower energy prices are sustained for several years, this development likely will help generate increased demand for livestock and poultry products in oil-importing developing nations. In the U.S., consumers appear to have used a substantial part of the energy cost savings to reduce debts and replace durable goods worn out during the years of high interest rates and rapid inflation. Even so, reduced petroleum prices probably have had a slight positive effect on U.S. demand for farm products. The demand effect probably has been larger in such major oil importing countries as Japan, Korea, Taiwan, Brazil, and Argentina, as well as slightly positive in Eastern and Western Europe. In Brazil and Argentina, reduced energy costs, if they are maintained near mid-1987 levels, may help accelerate domestic economic growth, increasing domestic demand for farm products and tending to reduce export availabilities from levels that would otherwise exist. Reduced energy import costs also are a positive influence on the balance of trade for these nations, and tend to slightly ease external debt-servicing problems. However, a time lag of at least two or three years may be needed for these positive effects on agriculture to emerge.

Lower petroleum prices also raise questions about the impact on U.S. agricultural exports to petroleum exporting nations. U.S. agricultural exports to these countries as a group increased substantially in the last decade. However, sharply reduced purchasing power as a result of lower oil prices may slow or halt that trend.

As shown in Table 21, agricultural products likely to be most affected include poultry and poultry products, other meats and wheat. Imports of these products by oil exporting nations as a group grew rapidly from 1972 to 1982, as large oil revenues brought dietary changes. However, that trend has been reversed in the past three or four years. Earlier growth was most pronounced for poultry imports, with a 888 percent expansion between 1972 and 1982. But by 1985, poultry imports by oil exporters as a group had slipped 23 percent below the 1982 record, with declines in Mideast, North Africa, and U.S.S.R. Other meat imports by oil exporters as a group rose by 105 percent from 1972 to 1982 and have since declined by about 5 percent. Wheat and flour imports by these nations nearly doubled during the earlier period, but have risen by only about 5 percent from 1982 to 1985. Wheat and flour imports by the Mideast, North Africa, and Western Hemisphere have shown an upward trend since 1982. During the first half of the 1980s, wheat and flour imports by the North Sea nations and other oil-exporting nations remained relatively steady, but declined in U.S.S.R.

Future trends in agricultural exports to these markets likely will be sensitive to trends in petroleum prices. Through mid-1987, the decline in prices and quantities appeared to be reducing oil revenues to Mideast and North African nations by approximately $20 to $35 billion per year from levels of the early 1980s. Lower energy prices reflect conservation efforts and new technology in insulation, transportation, heating, and cooling, resulting from rapidly rising prices of the 1970s. Other factors included the development of alternative energy sources, and substantially increased petroleum production in non-OPEC regions in the last decade, including the North Sea, Mexico, and the north slope of Alaska. Since 1977, OPEC's crude oil production reportedly has fallen approximately 50 percent, with its share of world oil exports dropping from

Table 21. Imports of Selected Products by Oil Exporting Nations, Selected Years, 1972-85.

Product and Region	1972	1977	1980	1982	1983	1984	1985
Poultry (000 metric tons)							
Mideast and N. Africa	26.0	192.0	458.7	570.4	504.4	442.7	409.7
Western Hemisphere	6.8	25.6	24.9	39.1	26.8	37.0	39.6
North Sea	9.6	10.7	28.7	28.2	51.9	54.2	63.8
USSR	44.9	120.7	159.0	260.2	205.6	113.8	141.2
Others	6.6	28.1	23.6	30.1	26.1	22.7	61.6
Total	93.9	377.1	694.9	928.0	814.8	670.4	715.9
Other Meats (000 metric tons)[a]							
Mideast and N. Africa	31.2	242.2	457.5	630.2	700.9	743.6	662.0
Western Hemisphere	120.4	206.5	143.7	179.4	159.2	187.5	237.2
North Sea	793.2	643.5	609.6	564.2	486.9	472.0	466.7
USSR	40.1	439.9	580.6	594.4	681.3	552.4	550.4
Others	45.0	66.8	88.5	142.7	119.3	107.3	92.3
Total	1029.9	1598.9	1879.9	2110.9	2147.6	2062.8	2008.6
Wheat and Flour (mil. metric tons)							
Mideast and N. Africa	5.097	10.292	14.368	15.340	18.923	20.453	18.679
Western Hemisphere	1.481	1.423	1.908	1.498	1.578	1.568	1.651
North Sea	4.714	4.172	2.636	2.009	1.646	1.474	2.034
USSR	8.481	7.142	16.032	22.160	22.248	27.279	20.573
Others	2.456	2.615	3.839	3.605	3.471	3.362	3.905
Total	22.229	25.644	38.783	44.612	47.866	54.136	46.842

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

[a] Other meat = meat, fresh, chilled or frozen, excluding poultry meat fresh, chilled, or frozen.

wo-thirds to one-third in the same time period.

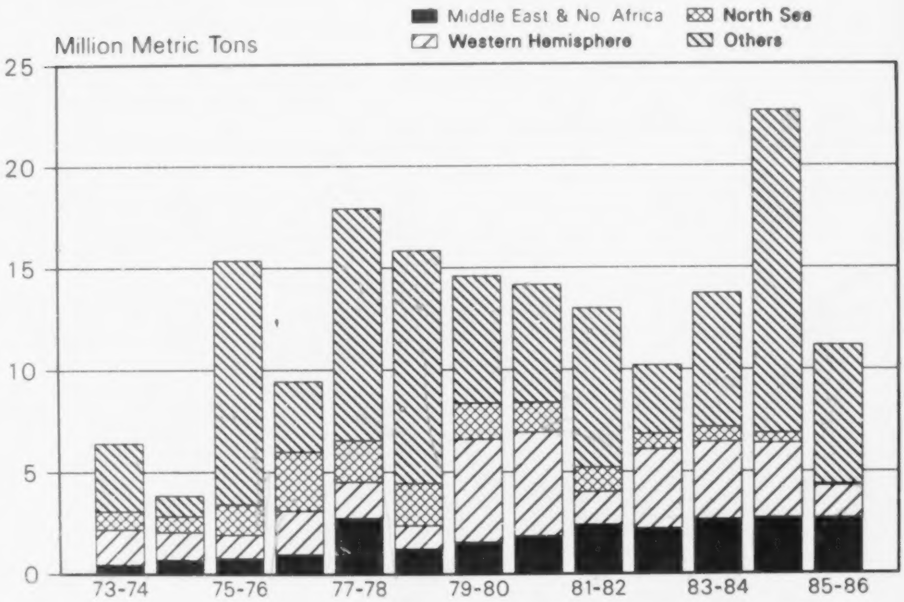
n the years just ahead, the trend toward energy conservation may slow but probably will not be halted completely. Lower prices will greatly reduce new oil exploration activities and also will cause production to be halted in some marginal producing areas. However, the demand for petroleum s believed to be highly inelastic in the short run, so that consumption increases only slightly with sharp declines in prices or is reduced only slightly with sharply higher prices. Inelastic demand and OPEC's much smaller market share than in the 1970s may temper increases in petroleum prices in the next one to three years. If so, that likely would limit oil exporters' purchases of agricultural imports, partially offsetting a tendency toward increased imports of farm products by energy importing nations. However, the U.S. export enhancement program for wheat, flour, and barley has been targeted strongly toward nations in the Middle East and North Africa and may help to offset negative impacts from reduced oil export revenues.

U.S. Exports to Oil-Exporting Nations

As Figures 55 and 56 show, U.S. corn and wheat exports to the Mideastern, North African, and other oil exporting nations grew rapidly during the 1970s and continued to expand into the mid-1980s, despite declining U.S. exports to other areas. Combined U.S. corn exports to these areas in fiscal 1985-86 accounted for 9 percent of all U.S. corn exports, with an additional 5 percent being shipped to oil-exporting nations in the North Sea and Western Hemisphere areas. When the Soviet Union is included, 35 percent of last season's U.S. corn exports went to oil exporting nations. Including USSR, 26 percent of the total U.S. June-May 1985-86 wheat exports were sold to oil exporting nations. About 15 percent of U.S. wheat exports were shipped to oil exporters in the Mideast and North Africa, 4 percent to Western Hemisphere oil exporters, and 5 percent to other non-Soviet oil exporting nations. Less than one percent of the total U.S. wheat exports that year went to USSR.

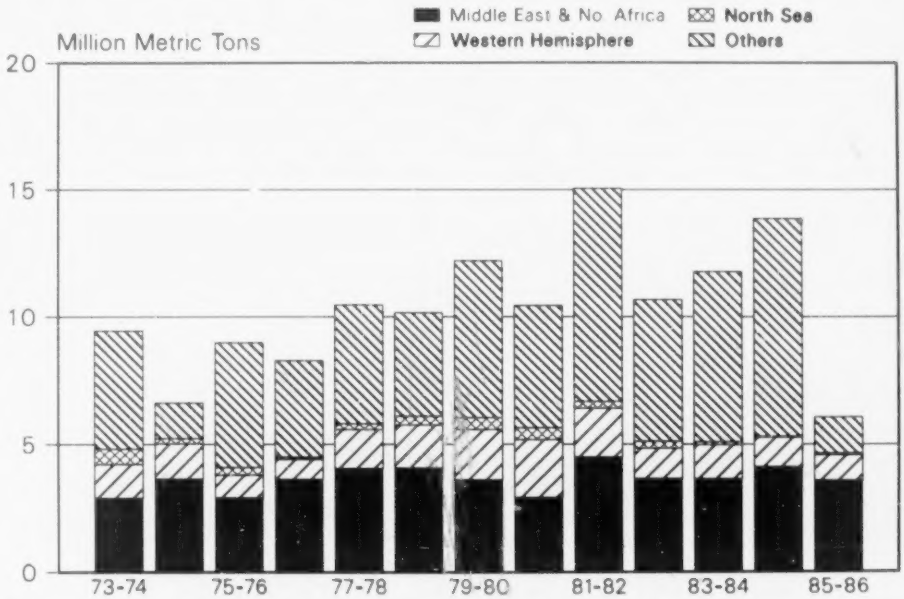
With 35 percent of U.S. corn exports and 26 percent of U.S. wheat exports accounted for by oil exporting nations, the relatively low petroleum prices may continue to slightly restrain the demand for U.S. grain in these areas in the next year or two.

Figure 55. U.S. Corn Exports to Oil Exporting Nations, 1973-74 to 1985-86.



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues.

Figure 56. U.S. Wheat Exports to Oil Exporting Nations, 1973-74 to 1985-86.



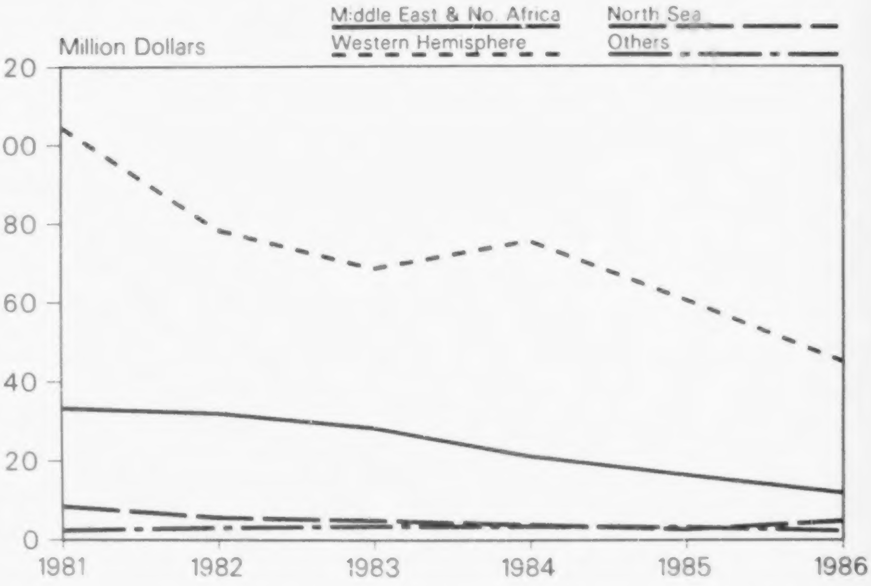
Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues.

The exact level of U.S. grain purchases by these nations will depend on domestic grain production, priorities placed on food vs. industrial imports, political relationships with the U.S., and U.S. government export enhancement (or Payment-in-Kind) programs. In 1986-87, the U.S. Wheat Export Payment-in-Kind program was targeted heavily to Mideast countries and USSR. In addition, large U.S. barley sales have been made to Saudi Arabia under the same program. In some instances, these programs appear to have reduced the cost of grain to recipient nations by up to one-third from current cash price levels and 50 percent or more from levels of the early 1980s, and have compensated for reduced oil export revenues. A continuation of that pattern in 1987-88 would help to support grain import demand in that part of the world, despite relatively low petroleum prices.

Trends in U.S. exports to non-Mideast oil-exporting nations indicate most of those areas, except for USSR, have already reduced their grain imports in the last few years in response to various economic forces. Without offsetting export-assistance programs from the U.S., it would not be surprising to see exports to these nations continue to trend slightly downward during the next one to three years. However, declines in these export markets appear likely to be offset by increased demand in oil-importing nations as a group. Soviet imports may be influenced some by reduced petroleum revenues, but also will depend heavily on that nation's domestic grain production levels and the priority given to maintaining or increasing per capita availability of meat, poultry, and dairy products.

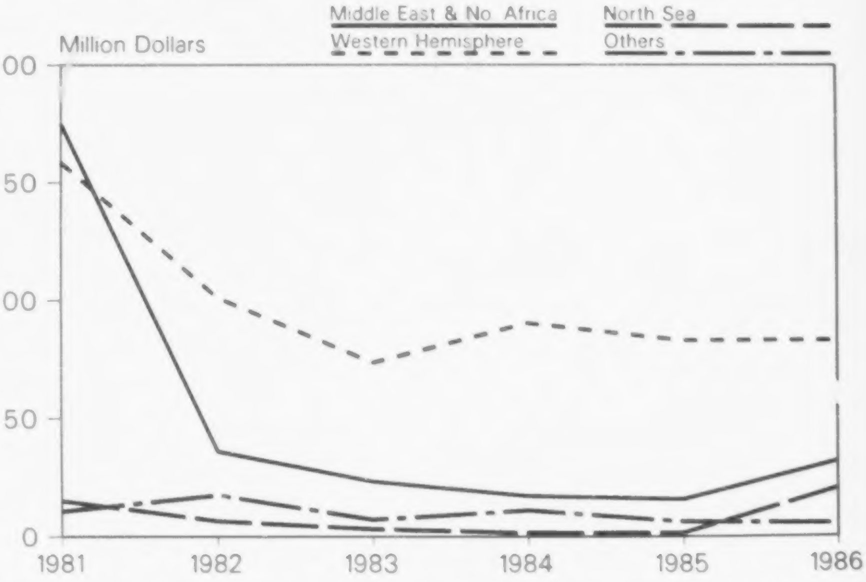
Except for exports to a few oil exporters in the other oil exporting nations category (primarily Malaysia and Indonesia), U.S. red meat and poultry exports to oil exporting nations have performed much less favorably than has been the case with grains (see Figures 57 and 58). U.S. exports of these products to nearly all oil exporters have dropped sharply since the start of the decade. Reduced oil revenues will do nothing to reverse this trend, and in fact, could slightly accelerate recent downward trends in the short term.

Figure 57. U.S. Red Meat Exports to Oil Exporting Nations, 1981 to 1986.



Source: Personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

Figure 58. U.S. Poultry Exports to Oil Exporting Nations, 1981 to 1986.



Source: Personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

Trend Toward Increased Barter Trading

In the last few years, barter trading, sometimes referred to as countertrade, has increased in importance for developing nations and centrally planned economies. While it is not a new development, its growing importance was recognized in the U.S. Food Security Act of 1985. That legislation includes a strong encouragement from Congress for the U.S. to become involved in barter trading for strategic raw materials. The act authorizes barter trading with CCC-owned U.S. agricultural commodities, and instructs the Secretary of Agriculture to provide technical assistance in such trading for U.S. exporters who request it.[54]

The main incentives for barter trading are a lack of foreign exchange in developing nations and inadequate financing to obtain needed imports by more usual marketing methods. This category of trading can include exchange of goods and/or services from one country for goods and services of another. Or, in other variations, it can include counterpurchases or bilateral clearing accounts.[55] Some observers express concern that this process bypasses normal market mechanisms, and in that way avoids realistic price determination and subjection of exporters to consumer quality demands that normally would be communicated through market channels. As a result, prices involved may be artificially high, quality of goods may be low, and dumping of products into developed countries may occur. Sales at prices below original production and marketing costs are regarded as dumping.

The U.S. barter trade in farm products has never been very large, even though the practice has been used by the U.S. as far back as the 1950s. It is doubtful that the practice will grow into a major outlet for the nation's agricultural exports. Despite its weaknesses, barter trade can be a distinct advantage for some countries, and in some cases could conceivably be a tool to facilitate economic growth and eventual development of more conventional markets for farm products.

Longer Term Prospects for U.S. and World Agricultural Trade[56]

With dramatic changes in U.S. agricultural policy implemented in 1986, a key question for both the production agriculture and agribusiness sectors is: Will the lower farm price support levels encourage a rapid recovery in the U.S. share of world agriculture trade and in the level of U.S. exports in the next few years? To answer this question, a research group at Iowa State University and the University of Missouri, in cooperation with Wharton Econometric Forecasting Associates, developed econometric forecasts of U.S. and world trade in major agricultural commodities to 1996-97. These forecasts are based on the assumptions of no major weather disasters, political upheavals, or major alterations of U.S. agricultural policies from those prescribed by the U.S. Food Security Act of 1985.

In general, the forecasts show a continuation of recent trends in world agriculture, with consumption of major grains remaining in a gradual long-term upward trend. Area planted to grains is expected to remain nearly constant in most major grain exporting nations, with the exception of a moderate increase in the U.S. toward the end of the period as government land-idling incentives are reduced. Yields both in the U.S. and non-U.S. producing areas are forecast to increase modestly through the mid-1990s and to adequately meet the anticipated growth in world consumption. India is projected to remain a small net exporter of wheat, along with a slight upward trend in China's wheat imports and modestly increased Soviet imports of wheat and coarse grains. EC coarse grain exports are expected to increase modestly during the same period. Modest upward growth of U.S. wheat and coarse grain exports, which began in 1986-87, is forecast to continue through the 1995-96 trade year. However, U.S. coarse grain exports are projected to remain about 7 percent below the record 1979-80 level. U.S. wheat exports in 1995-96 are indicated to be about 14 percent below the previous record level of 1.77 billion bushels reached in 1981-82. Soybean exports from the U.S. are projected to expand modestly but remain 12 percent below the 1981-82 record by 1995-96, because of expanded oilseed production in Western Europe, South America, and other areas. Renewed growth in exports, increased domestic processing and grain feeding, and government incentives to reduce crop plantings are forecast to gradually reduce U.S. carryover stocks of major crops beginning in late 1988. By 1995-96, ending U.S. corn carryover stocks are projected to be three-fourths the 1986-87 level. Prices received by farmers are forecast to increase moderately beginning in 1991-92. U.S. wheat carryover stocks are indicated to drop to about half the current level by 1991-92 and to coincide with a slight uptrend in wheat prices forecast to start at that time. Soybeans and cotton are indicated to move into significantly declining carryover stocks situations earlier than grains, with stocks of both these crops beginning a gradual long-term downward trend in 1987-88. Soybean stocks are indicated to decline to slightly over half the 1986-87 level by 1988-89, with cotton also reaching that point in 1988-89. Prices for both crops are forecast to trend modestly upward in the early to mid-1990s. A similar price pattern is indicated for wheat, corn, and other feed grains.

These forecasts of U.S. and world exports of major crop products are summarized in Table 22. In general, they show longer-run trends that point to continued substantial excess production capacity in U.S. agriculture into the mid-1990s. The excess capacity will be restrained somewhat by production control programs specified in the Food Security Act of 1985. Barring major weather problems, however, these programs may require several years to reduce the nation's grain carryover stocks to levels generally considered acceptable in the U.S. In the meantime, costs of U.S. farm income support programs will be large, and could conceivably generate pressure to modify the 1985 farm legislation. Part of the cost of balancing global production and utilization also will be transferred to other nations through lower U.S. price support levels and a depressing effect on world grain prices. These costs will probably appear in the form of rising farm program expenses in EC, reduced farm incomes and asset values in areas such as Canada, Australia, and parts of Latin America where government farm income support programs traditionally have been limited, and reduced incentives to increase self-sufficiency in developing nations that have serious food shortage problems.

Table 22. U.S. and World Net Export Forecasts for Wheat, Coarse Grains, Soybeans, and Soybean Meal in 1990-91 and 1995-96, and Comparisons with 1986-87 in Millions of Metric Tons.

Commodity	Prelim 1986-87	Forecast 1990-91	Forecast 1995-96
World wheat	76.82	95.87	105.89
U.S. wheat	26.54	37.78	41.44
Non-U.S. wheat	50.28	58.09	64.45
U.S., percent of world	34.5	39.4	39.1
World coarse grains	69.96	82.18	96.69
U.S. coarse grains	45.61	54.92	65.69
Non-U.S. coarse grains	24.35	27.26	31.00
U.S., percent of world	65.2	66.8	67.9
World soybeans	25.20	26.63	29.55
U.S. soybeans	19.05	20.31	22.11
Non-U.S. soybeans	6.15	6.32	7.44
U.S. percent of world	75.6	76.3	74.8
World soybean meal	17.6	20.91	25.88
U.S. soybean meal	5.90	7.03	10.58
Non-U.S. soybean meal	11.70	13.88	15.30
U.S., percent of world	33.5	33.6	40.9

Sources: Forecasts are from FAPRI *Agricultural Outlook*, Food and Agricultural Policy Research Institute, Iowa State University (Ames, Iowa), University of Missouri (Columbia, Mo.), and Wharton Econometrics (Philadelphia, Pa.), Spring 1987. The 1986-87 data are from U.S. Department of Agriculture, Foreign Agriculture Service, *Foreign Agricultural Circular, Oilseeds and Products*, FOP 5-86, May 1986, and *Foreign Agricultural Circular, Grains*, FG 5-86, May 1986.

Upcoming GATT Negotiations

In an early 1987 meeting in Uruguay, the groundwork began for the eighth round, or Uruguay round, of GATT (General Agreement on Tariffs and Trade) Multilateral Trade Negotiations (MTN), which are expected to take place during the next few years. At this writing, 92 nations are expected to participate in the Uruguay round.[57] Previous GATT negotiations focused more on non-agricultural trade issues. But with widespread concern about growing protectionism, increased subsidies in agricultural trade, and depressed farm incomes, participating nations have agreed to move agricultural trade issues to the forefront. These negotiations will be an effort by major industrial and agricultural exporting and importing nations to reach an agreement on the reduction of import restrictions and subsidies on exports of raw and processed farm products. If successful, the outcome would have important implications for agricultural producers and consumers throughout the world.

GATT and Its Origins[58]

GATT had its origins in 1946 and 1947 meetings at which the International Monetary Fund (IMF) and a fixed system of currency exchange rates were established after World War II. The U.S. at that time proposed three organizations for dealing with international financing and trade problems: (1) the IMF, (2) the World Bank, and (3) the International Trade Organization to deal with trade policy issues. The proposed International Trade Organization would have been assigned the tasks of promoting trade liberalization and enforcing trade policy agreements. The first two organizations were approved, but the U.S. Congress vetoed the International Trade Organization because of an unwillingness to transfer domestic policy to an international organization. In its place, the General Agreement on Tariffs and Trade (GATT) was established to encourage trade liberalization but was not given enforcement powers. GATT is a set of trading rights and obligations voluntarily entered into by a group of nations who are signatories to the agreement. Although the organization has no enforcement powers, other nations have the ability to withdraw concessions from a GATT member who has been determined to be in violation of trading rules.[59] GATT specifies rules and guidelines for international trade, provides a forum for discussion of trade problems and provides means by which members can formally challenge other members' trading practices and policies. Over half of the cases of trade practices being protested by the U.S. in late 1985 involved agricultural products, with most involving EC, Japan, and Canada.[60]

The U.S. had a major influence in the origin and development of the mission for this organization. From the start, GATT rules provided special considerations for agricultural imports and exports that were not applicable to industrial products. For example, GATT provisions include four articles dealing with quantitative restrictions on imports of agricultural products. These include Article XI prohibiting the use of quotas (with certain exceptions), Article XII, providing an exception in the use of quotas for balance of payment reasons, Article XIII outlining rules where other exceptions are applied and quotas are used, and Article XIV, which provides additional exceptions to Article XIII in cases of certain balance of payment situations.[61] In original GATT rules in Article XVI 1, subsidies on exports were permitted, with a requirement that they be reported. In 1955, rules were modified to require that nations not use subsidies on primary products to obtain more than an equitable share of world trade in the product or products in question. Regulations at that time were extended to prohibit subsidies on nonprimary product exports, thus bringing a distinction between farm and nonfarm products. Efforts to clarify these regulations were made during the 1979 Tokyo Round of GATT negotiations, but with little success.[62]

Because of its prominence as an agricultural producer and its strong post-war political position, the U.S., in 1955, was able to obtain a waiver of GATT regulations that allowed it to impose quantitative restrictions on agricutural imports under Section 22 of the U.S. Agricultural Adjustment Act.[63] The Section 22 waiver permits the U.S. to implement import quotas if imports into the U.S. threaten its ability to manage certain domestic commodity programs. The U.S. efforts also were a major factor in establishing rules that excluded agriculture from prohibitions on export subsidies. At the time these exceptions were established, they were contrary to the purposes of GATT but did not cause major concern in a world where agricultural trade was much smaller than it is today and where only a few net agricultural exporting nations existed.

World agricultural trade in farm products has changed dramatically since the post-war decade and these special exclusions for agriculture are now causing problems both for the U.S. and for many of its trading partners. In the late 1940s and 1950s, U.S. agriculture was much less dependent on exports as a source of income and a means of more fully utilizing its production capacity. Few other major agricultural exporters existed, so resistance to allowing agricultural export subsidies and U.S. import quotas was limited. Concerns about these provisions also were relatively minor during the 1970s, with rapidly expanding world import demand for farm products and with several nations shifting from net exporters to net importers.

However, in the 1980s with large agricultural surpluses, low world prices, several nations shifting from grain importers to exporters, a major agricultural trade subsidy war between the U.S. and EC, and growing protectionism, there is a strong need to reconsider GATT regulations relating to agriculture. A multinational approach may well be needed to bring an end to the current trade war. The reason for this is that if one participant attempted to halt the subsidy war unilaterally, that nation would face a high risk that its export market share would decline sharply as competing countries keep their subsidies in place.[64]

The broad objectives of the Uruguay Round of GATT negotiations, as established at a meeting in Punta del Este, Uruguay, in early 1987 are: (1) to improve market access through reduced import barriers, (2) to increase discipline in use of trade subsidies, and reduce their adverse effects and (3) to deal with the underlying causes of trade subsidies.[65]

Requirement for Effective GATT Negotiations

Protection of domestic agricultural sectors is a major factor in current international trade policy issues. For example, the European Community (EC) protects its grain producers with a complex system of price supports that in some cases are about double the world market price and include large variable import levies or duties that discourage import.[66] A major objective of EC farm policy has been to provide self-sufficiency in farm products, and to avoid a repeat of major food shortages that occurred during and immediately after World War II. That objective has been attained and EC is now one of the world's largest agricultural exporters. Its policy objectives also have included efforts to maintain a large number of relatively small farms.

The U.S. has highly protective policies relating to its sugar and dairy industries, including import controls and support prices above world markets. It also has a system of deficiency payments to protect crop producers if world prices fall below specific target prices.[67] These crop payments, however, are different from domestic price support systems in other nations, since U.S. producers are required to idle a significant part of their cropland to qualify for the price supports. In addition, the U.S. has subsidies for the alcohol fuels industry in the form of motor fuel tax exemptions for alcohol fuels. In a sense, these tax exemptions are a protection for the industry and a subsidy for exports of byproduct feeds produced in the manufacturing of alcohol fuels.[68]

Brazil and Argentina have different export taxes on processed soybean products than on raw soybeans to encourage domestic processing of soybeans and export of value-added crops. EC policies also are structured to favor importing of oilseeds for processing over imports of processed products. Japan has very high domestic support prices for producers of rice and other grains and allows no imports of rice in order to ensure some minimal level of food self-sufficiency. The Japanese no doubt consider a minimal level of raw farm product production essential for national security in a nation already heavily dependent on foreign food supplies and with a very limited domestic cropland base. Japan also has other major restrictions on agricultural imports including quotas on meat imports, quotas on imports of corn for industrial processing, and restrictions preventing livestock and poultry producers from buying unprocessed imported corn or sorghum and grinding and mixing it with other feed ingredients on their farms.[69]

These are only a few examples of major restrictions on agricultural trade that exist around the world. For the GATT negotiations to be fully effective in meeting the objective of liberalizing agricultural trade policies, major participating nations will need to be willing to subject their domestic farm policies to negotiation in an international setting, and their respective legislative bodies will need to provide negotiators with authority for such negotiation.[70] Domestic policies of the U.S., EC, Japan, and other nations stem from unique sets of social, cultural, historical, geographic, and economic conditions, and national values arising from those conditions. For example, it is doubtful that the U.S. Congress would be willing to delegate authority to completely negotiate away the U.S. target price system for grains or the basic system of sugar and dairy import restrictions and price support programs. For similar reasons, it is doubtful that EC would provide authority to completely negotiate away its variable levy pricing system on grain imports. It also is doubtful that Japan would provide authority to negotiate away all rice import restrictions, thus greatly reducing self-sufficiency in what historically has been its most basic food, and leaving itself more vulnerable to trade disruptions in the event of war, labor strikes, political embargoes, or other unpredictable occurrences.

With these complex and differing national backgrounds, a lengthy and extended period of negotiation should be expected in the upcoming GATT round. Although a four-year timetable was established at the initial GATT meeting in early 1987, some analysts anticipate, from the experience of previous GATT rounds, that current negotiations may last as long as eight years.[71] Immediate major restructuring of domestic farm policies of such nations as the U.S., Japan, and EC should not realistically be expected to result from the negotiations. However, a gradual easing of import restrictions in some nations and a gradual reduction in use of export subsidies seems likely. Grain exporting nations such as Australia, Canada, and Argentina that, so far, have remained outside the U.S.-EC export-subsidy war, also will be very interested in negotiating limits on the use of export subsidies and possible time schedules for eventual complete phasing out of their use. Otherwise, nations not currently participating in the trade-subsidy war will face very unpleasant choices of accepting declining export shares and further reductions in incomes of their agricultural sectors, joining the subsidy war themselves or providing large direct government income transfers to soften the impact on their farm sectors. While the GATT negotiations will be difficult and highly controversial, some progress in dealing with current trade-related policy issues is anticipated.

Emerging Trade Policy Issues for U.S. and World Agriculture

The financial condition of U.S. agriculture and related economic sectors has deteriorated substantially in the past five years, due in part to the sharp decline in the nation's agricultural exports and various actors behind the declining export demand. Financial stress in American agriculture and agribusiness is shown by he unusually high percentage of U.S. armers being forced to exit from agriculture hrough bankruptcy or other means, excess capacity in the U.S. agricultural marketing and transportation system of as much as 25 o 35 percent, severe financial losses and consolidation of firms and operations in the U.S. farm machinery industry, failure of the argest number of U.S. agricultural banks since the 1930s, and a sharp decline in asset values in U.S. agriculture and agribusiness. There is evidence that financial conditions in U.S. agriculture as a sector are beginning to stabilize, but sizable problems remain to be resolved in the Farm Credit System and among a sizable number of individual producers and agribusiness irms.

These problems have not been unique to U.S. agriculture, but also are being faced by farmers in several other nations. However, such problems, until very recently, may have been more serious in the U.S. than elsewhere for at least three reasons. First is he traditional role of U.S. farm policy as the adjustment mechanism for balancing world supply and demand. Most other exporting nations do not have a policy of building arge carryover stocks when world supplies exceed demand. Instead, their agricultural sectors are structured to move excess production into world markets and maintain carryover stocks near normal levels. Long-standing U.S. policies result in much of the world's excess grain production being held n U.S. carryover stocks.[72] Thus, when oreign grain supplies are large relative to demand, U.S. exports tend to decline as other nations market their excess producion. That makes the U.S. a residual supplier and its carryover stocks rise. Second, this process was accelerated from 1980 to 1985 by the strength of the American dollar, which placed U.S. farm product exports at a competitive disadvanage relative to other exporters. Strength of he U.S. dollar, at one point, was great enough to permit imports of major farm products such as wheat, soybeans, soybean oil, oats, and pork into the U.S. at imes during 1985 and 1986, despite sizable import duties. A strong U.S. dollar encouraged foreign nations to invest in order to expand agricultural production and also enabled them to market those supplies more easily than would have been possible with a weak dollar. While the dollar has dropped sharply in value against several industrial nation currencies since early 1985, it remains quite strong relative to currencies of many other grain exporters and developing nation importers. Also investments made when the dollar was stronger have few alternative uses and will continue to be used for agricultural production even with low farm product prices.

A third factor making U.S. agriculture extremely vulnerable to declining export demand is its large excess production capacity. In the absence of government supply control programs, domestic demand would absorb only about two-fifths of the normal U.S. wheat production, along with one-half of the U.S. soybean crop and two-thirds of the annual U.S. corn production. A healthy and growing export demand thus is vitally important to U.S. agriculture in utilizing its excess production capacity. Other sectors with a major stake in strong export markets include rural communities across the U.S. and workers and firms in the agricultural input, marketing, finance, and transportation sectors. Negative impacts on U.S. production agriculture from the sharp decline in exports in the 1981-1986 period have been tempered by aggressive government land-idling programs and sharply increased direct income payments to U.S. farmers to compensate for land being removed from production. However, the net result has been a sharp increase in U.S. government budget expenditures and pressure to reduce such expenditures in the next few years. In addition, land-idling programs have had major negative impacts on agribusiness firms and rural communities by reducing the demand for farm supplies and farm product marketing services.

Trade policies alone will not solve the financial problems of the U.S. agricultural sector. But, because of its heavy dependence on exports, realistic domestic policies for U.S. agriculture cannot be formulated without a recognition of their linkage to the export sector and the current export environment. With severe financial stress in U.S. agriculture and a recently accelerated progression of events toward an international subsidy and import-restriction trade war, there is an increasing urgency for the U.S. and its trading partners to carefully examine policies needed to encourage agricultural exports.

Dealing with Exchange-Rate Problems

To illustrate the effect of the strong U.S. dollar in the early 1980s on the nation's farm product exports, a U.S. Department of Agriculture analysis indicated $3 billion of the decline in U.S. farm product exports during 1981-82 could be attributed to strength of the dollar relative to foreign currencies. Almost 10 million tons (400 million bushels) of the decline were assigned to corn exports alone. The authors also indicated a 20 percent trade-weighted, inflation-adjusted rise in the dollar over a two-year period would decrease combined U.S. exports of corn, wheat, and soybeans by 16 percent from levels that would otherwise exist, providing the market influences remain unchanged.[73]

Responses to weakness in the dollar's exchange rate may involve long lags, particularly if they follow an extended period of relatively high prices and a relatively strong U.S. dollar. For example, strong grain and oilseed prices during the 1970s and the strong U.S. dollar in the early 1980s encouraged large investments in agriculture and farm imput industries in many parts of the world. Investments included machinery, fertilizer and chemical production capacity, land clearing, drainage, irrigation, development of improved varieties, and related production-increasing activities. Once these investments have been made, they continue to be used in production for an extended period of time, even if dollar-denominated world grain prices drop to very low levels.

With these long-term exchange rate effects, it appears important to give high priority to policy changes that will promote a reasonably stable and realistic exchange rate of the U.S. dollar. Instability of the U.S. dollar's exchange rate, to a considerable extent, appears to have its roots in U.S. monetary and fiscal policy, including the large U.S. budget deficit and its resulting decrease in funds available for private borrowing and investment.[74] The deficit has been financed, in part, by an inflow of foreign capital to earn high U.S. real (inflation-adjusted) interest rates. Increased movement of investment funds into the U.S. and reduced U.S. foreign investments tend to strengthen the demand for the U.S. dollar relative to the available supply, thus tending to increase its value in foreign exchange markets. This process also drains investment funds from other nations, thus tending to reduce foreign economic growth rates and retarding growth of export demand in some traditionally large U.S. agricultural export markets such as Western Europe. High U.S. real interest rates stem from a restrictive U.S. monetary policy meant to offset inflationary pressures from deficit spending. While U.S. interest rates declined significantly in 1986 and early 1987, the U.S. inflation rate also has remained well below the levels of the 1970s and left U.S. real interest rates at relatively high levels. In mid-1987, that still left the U.S. with relatively high real interest rates when compared with the average of the 1970s and with real interset rates of Japan and some West European nations. If confidence in the U.S. dollar is weakened by other developments, still higher U.S. interest rates may be required to ration available loan funds and attract foreign investment to the U.S.

More liberal growth of the nation's money supply to finance the budget deficit almost certainly would increase U.S. and world inflationary pressures, with the accompanying dangers of a new round of inflation-induced U.S. private and developing-nation debt buildup and more serious adjustment problems in the future. Liberal growth of the U.S. money supply is also likely to weaken the U.S. dollar, thus making it more difficult for the rest of the world to export to the U.S. and, in some cases, worsening debt-repayment problems of developing nations. In addition, with U.S. interest rates largely deregulated, renewed inflation likely would increase interest rates, and the resulting interest cost on the currently outstanding U.S. government debt of nearly 2.4 trillion dollars would increase rapidly U.S. annual budget deficits. Thus, it appears doubtful that the underlying U.S. problem of large budget deficits could be solved by rapid growth in the nation's money supply, and that approach would carry large risks of more serious adjustment problems in the future.

As an indication of the changing U.S. budget situation, the annual federal budget deficit in 1979 was approximately $28 billion. With a sharp reduction in U.S. federal income tax rates and continued high government spending, it rose to $212 billion by 1985 and is expected to be in the $160 to $200 billion range in fiscal 1987.

With growing concern that the U.S. budget deficit would continue at or near a $200 billion annual rate for the foreseeable future, the U.S. Congress in late 1985, passed the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Reduction Act. This act provides for a series of increasingly large annual reductions in expenditures in most categories of the U.S. budget, except for social programs and long-term agricultural programs but including defense programs. Its goal is to balance the U.S. budget as the decade of the 1980s comes to a close. If this act is implemented fully and continually in the next few years, it may well permit a further decline in real U.S. interest rates and could help to stabilize or slightly reduce the exchange rate of the U.S. dollar against developing nation and other grain exporters' currencies. If so, that would be one of several factors helping to maintain a gradual uptrend in U.S. agricultural exports in the late 1980s and early 1990s.

Side benefits from dealing with the U.S. budget deficit likely would include a decline in interest-related cost pressures on U.S. agriculture and somewhat increased U.S. private investment to stimulate the nation's economy and improve its productivity. Lower real interest rates also would have positive effects on trade by easing interest cost burdens of developing nations and tending to accelerate their economic growth rates. Dealing with exchange rates through monetary policy alone runs the risk of sharp and disruptive fluctuations in the value of the U.S. dollar. However, a more balanced fiscal and monetary policy approach would appear less likely to cause such reactions. With the far-reaching exchange rate impacts outlined here, U.S. economic policy developments are important to the future of U.S. agriculture, perhaps nearly as important as changes in its farm price support programs.

Trade Subsidies

Trade subsidies take several different forms, including direct payments to producers and/or processors, price or commodity rebates to foreign buyers, subsidized financing terms, or outright donations of products or services to foreign importers. Such subsidies typically are used to increase an exporting nation's share of global trade and/or reduce surplus domestic supplies while protecting incomes of its agricultural producers. The U.S., as well as many other nations, has used such subsidies from time to time. During the past two decades, trade negotiations between the U.S. and trading partners have been aimed at reducing export subsidies and other restraints to foreign trade. However, in the last 18 months, export subsidies by the U.S. and EC have increased sharply as each attempts to protect its agriculture from adverse developments in the world economy and to increase its respective share of world food trade. Current U.S. examples of such subsidies include deficiency payments to grain producers under its target price system (these payments also are a compensation to producers for idling a sizable part of their cropland base), PL 480 export programs, the Export Payment-in-Kind program, and exports of byproduct feed ingredients from the corn milling industry, which are influenced by highway tax exemptions on alcohol fuels.

U.S. trade policy in 1986-87 was directed at the increasingly large grain export subsidies used by EC to export its surplus grain production. The U.S. share of global exports of several major agricultural commodities has declined sharply in the past five years, and in some cases, EC share of those same commodity exports has increased. In reaction to its declining trade share, the U.S., in mid-1985, implemented an Export Payment-in-Kind program initially targeted against EC's subsidized wheat exports. This program was sharply expanded in 1986-87 to include exports of barley and sorghum as well as wheat. The program involves the granting of bonus quantities from U.S. government-owned grain or other farm product inventories when designated importers purchase commercial U.S. supplies. Its purpose is to make U.S. commercial agricultural exports competitive with subsidized EC exports. Through mid-1987, this program appeared to have contributed modestly to increased U.S. wheat and barley export shares, even though it was met by increased EC export subsidies. Recipient nations and areas under this program included the Middle East, North Africa, Eastern Europe, USSR, and the Peoples' Republic of China. The U.S. Food Security Act of 1985 mandates that U.S. export subsidies will be maintained at high levels for at least the next year.

A major caution should be raised in the use of such trade subsidies, particularly in an environment of relatively static world trade. Escalating subsidies are leading to an outright trade war, with each side progressively increasing its subsidies and/or lowering its prices to maintain its respective trade share, and with each side incurring progressively larger costs without gaining a major market advantage. The trade war also has been pushed into nonagricultural products, with the U.S. placing large import duties on certain electronic products from Japan and with EC in early 1987 also threatening to protect its economy from such imports.

Large export subsidies of U.S. and other major exporters also tend to have a strong negative impact on the agriculture of grain-importing developing nations. Such subsidies may depress prices in importing nations, thus weakening or removing the incentive for farmers in developing countries to expand production. In the long run, that could work to the disadvantage of consumers in recipient countries by limiting their nations' ability to become self-sufficient in food production. With these potential disadvantages, it is advisable to use trade subsidies with considerable caution. Such tools should not be expected to solve current food trade problems arising from excessive indebtedness, slow global economic growth, overvalued currencies, and excess resources in the agricultural sectors of grain exporting nations.

Debt Problems of Developing Nations

Developing-nation debt problems are interrelated with factors causing the strong U.S. dollar relative to many developing nation currencies. Dealing with the exchange rate problem and resulting reductions in real interest rates thus may provide partial relief to heavily indebted nations. However, lower real interest rates alone will not completely resolve debt burdens. Many developing-nation loans are very short term in nature. Increasing their repayment period also has been and will continue to be an important tool in helping such countries through current financial difficulties.[75] Other potentially important tools include more restrained monetary and fiscal policies in developing nations, policy measures designed to improve productivity of the economies involved, and lender exchanging of debt for equity in the developing-nation industries. While the task is a difficult one that will require caution, moderation, and a few more years of adjustment, the outcome is critically important for the world economy. Widespread inability of developing countries to meet debt repayment commitments could endanger multinational lending institutions, risk serious disruption of the world monetary system, and slow world economic growth or plant the seeds of a world-wide economic recession. Resolution of these problems also will be important for agricultural exporting nations, as well as for the physical well-being of people living in developing countries. These nations, as a group, were one of the fastest growing import markets for farm products during the 1970s. Policies leading to economic stability and growth may well offer significant growth in demand for U.S. farm products in the late 1980s or early 1990s.

Trade Protectionism

In today's world economy, there are strong pressures for increased protection of domestic industries against foreign imports. For example, the EC has threatened to place limitations on its annual imports of corn gluten feed and meal, oilseeds, and other U.S. farm products. In the United States, domestic content legislation that would require specific percentages of materials in goods sold in the United States to be produced domestically has been considered. In addition, the U.S. Congress has very seriously considered requiring large automatic retaliation against imports from nations that run consistently large trade deficits with the U.S. Other evidences of protectionism include voluntary restraints on Japanese exports of automobiles into the United States, which have been in effect the last few years.

Protectionist pressures within the U.S. increased sharply in 1986 and 1987, with the U.S. temporarily imposing nonbinding quotas on imports of EC white wine and other agricultural products in response to EC trade restrictions stemming from Spain and Portugal's admission into the EC. The U.S. also has restricted imports of Canadian hogs, imposed a tariff on imports of Canadian cedar shingles, threatened to take action against imports from Brazil unless that nation liberalizes policies related to imports of U.S. products, and has strongly warned EC against tightening its import restrictions.

These are only a few examples of a large list of recent and/or proposed protectionist trade policies. A Washington University study indicates such restrictions cost United States consumers about $58.5 billion annually in the form of hidden taxes, along with additional long-run costs through reduced incentives for innovation and improved productivity.[76] With high unemployment, strong foreign competition, and domestic political pressures, most other major trading nations also are facing strongly increased pressure to protect domestic industries through trade restrictions. However, the lessons of the 1930s should be a reminder that protectionism leads to declining trade and sluggish world economic activity.[77] In fact, protectionist trade policies of that period were a contributor to the world economic depression of the 1930s and are an important case example of the dangers of increased trade protectionism. In setting trade policy, it should also be recognized that trade requires two-way exchange between nations. One nation's exports generate revenue that is used to purchase its trading partner's products. The U.S. agricultural sector and the U.S. economy thus have a very important stake in resisting current tendencies toward increased trade protectionism.

Food Security

Food security is a critical and complex policy issue for much of the developing world. One aspect of the problem is illustrated by estimates that the caloric intake of more than 800 million people, or 60 percent of the population of less developed nations, is below the standard established by the United Nations Food and Agricultural Organization and the World Health Organization.[78] These estimates do not reflect quality dimensions of diets in less developed countries such as protein levels and other nutritional requirements. The hunger problem is concentrated in Sub-Sarahan Africa, as well as parts of Latin American and South Asia. While African food production has increased substantially in the past two years with improved weather, serious long-term problems and challenges in food production remain.[79]

Another view of current world food security is illustrated by food security standards for grain carryover stocks. Some world food authorities place minimum stock levels for food security purposes at 17 to 18 percent of global annual utilization. Global carryover stocks in 1987 are estimated at 24 percent of annual utilization, modestly above the minimum standard.[80] However, this standard is only a general guideline. The geographic distribution of stocks is important from a food security standpoint and also can have a considerable effect on prices paid to producers in exporting countries if stocks are concentrated in a few major exporting regions, as is currently the case.

Short-run solutions to food security problems are oriented largely toward meeting emergency food needs resulting from drought or other natural disasters. Difficult issues yet to be resolved include the desired size and location of reserve stocks, methods of sharing storage costs, and methods of acquiring and releasing stocks to minimize disruptions in importer and exporter nations. These issues are especially important for the people of Sub-Saharan Africa, the Indian subcontinent, and parts of Latin America where food shortages have been a frequent occurrence in the past.[81]

Long-run considerations of food security require policies for increasing food production in food-deficit developing nations, improved distribution systems, and population trends. Uneven distribution of food is reflected in severe poverty in many areas. In fact, poverty, lack of financing for food purchases, and physical distribution problems can be viewed as major elements in the current world food problem because global food production easily is sufficient to adequately meet the needs of the world's current population. Dealing effectively with these issues will be a major challenge for current and future generations. The need for a food security policy is highlighted by the fact that the third world has been the flashpoint for East-West conflicts.[82] For that reason, food security, poverty or economic well being, and world peace are closely interrelated.

Other Policy Issues

Other important trade-related policy issues include impacts from the use of bilateral trade agreements, strategies for encouraging expanded agricultural production in developing nations, and tax or subsidy policies, which some nations use to enhance competitiveness of value-added export industries. Use of bilateral agreements in world grain and oilseed trade expanded rapidly in the first few years after the United States entered into a long-term grain agreement with USSR in 1976. However, this trend has slowed considerably with growing world surplus stocks. Such agreements typically specify minimum annual quantities of product that exporting nations agree to provide to importers and importers agree to receive. Several of these agreements are being used by Canada, Argentina, Australia, and other grain exporting nations. The United States has a similar agreement with Mexico, although its grain trade agreement with China was allowed to expire at the end of 1984. The U.S. agreement with USSR is scheduled to expire at the end of the 1987-88 trade year ending September 30, 1988.

Bilateral agreements tend to bypass normal market functions of: (1) discouraging utilization when supplies are low and prices are high, and (2) encouraging utilization when prices are low. If use of long-term agreements should expand again, an increasing portion of the world grain market would be restricted, to some degree, from performing its normal market clearing and market rationing functions. In this setting, market areas not subject to these and other artificial trade restraints likely would be forced to bear an increasing share of the adjustment to changing world grain and oilseed supplies with a resulting increase in price volatility in such markets. A trend toward expanded use of long-term trade agreements thus would have important implications for developing nations that import grain and are not covered by long-term agreements and also for U.S. grain and livestock producers.

Expansion of production in developing nations is a complex and controversial problem that cuts across cultural, political, technological, and economic disciplines. Progress in this area will be important in meeting long-term food needs of the world's poorest nations. These countries have an extremely limited ability to buy U.S. farm products, with little hope for any major change in purchasing power or ability to import food in the next several years. Controversy in this area comes partly from a concern among agricultural producers in exporting nations that expanded production in developing countries will reduce imports and place downward pressure on global grain prices.

Examples of policies encouraging export of value-added products include the soybean industries in EC and Brazil. As noted in an earlier section of this report, the U.S. share of global processed soybean product exports has dropped substantially in recent years while these two areas have enjoyed a sharply rising share. Because the U.S. soybean processing industry has substantial excess capacity, this issue appears likely to receive additional attention in the next few years. Brazil encourages export of processed products rather than soybeans by differential export taxes, with a larger tax on soybean exports than on exports of soybean products, as well as by export quotas on soybeans, subsidized interest rates for processors, and duty-free imports of equipment used in production of export goods.[83] In the EC, a modest import tax is applied to soybean oil, thus favoring imports of soybeans for processing, rather than imports of both meal and oil. The processing industries in these areas and the U.S. appear to be moving closer to a confrontation. Consequently, this issue may be at the forefront of trade policy questions in the late 1980s and early 1990s.

Biotechnology: Implications for Future World Agricultural Trade

In the last few years, scientific developments have made possible the transfer of genes and other facilitating processes in plant and animal breeding that may sharply increase future agricultural productivity. Since biotechnology is in its infancy, its full impact will not be known for at least one to two decades and perhaps longer. Two recent developments in the field, targeted for commercial application are: (1) a naturally occurring hormone for cattle that increases milk production per cow by one-fifth or more from levels occurring under current production programs; and (2) a growth stimulant for swine that may increase feed-conversion efficiency by up to one-fifth or more from levels typical in current feeding programs. These two developments alone could have far-reaching effects on U.S. and world agriculture if they are widely adopted.

Livestock Biotechnology

The milk-production hormone would tend to sharply reduce the number of dairy cows (and dairy farmers) needed to meet market demand, would spread fixed costs in dairy production over more units of milk output, and might significantly lower total production costs per unit. The swine growth stimulant could sharply reduce grain requirements in the U.S. and world pork industries. Since the swine industry is one of the largest outlets for coarse grains, that would tend to increase surplus grain production while reducing grain import needs of major importing nations. The net effect could be a modest reduction in global grain trade at some time in the future.

Another currently available technology in livestock breeding is the ability to transplant fertilized eggs. Through this technique, offspring of genetically superior animals can be expanded in number much more rapidly than in the past. That process assists livestock breeders in developing animals with superior feed conversion efficiency, rates of gain, tendencies toward multiple births, desirable carcass qualities, and other beneficial features. During the next decade or two, this process may also contribute to improved production efficiency in animal agriculture and reduced grain requirements per unit of meat output. It thus may also be a restraint on future growth rates in global grain trade.

Crop Biotechnology

An emerging area where potential productivity gains remain largely unknown is in the application of biotechnology to crop production. Future developments in this area might include development of grains, oilseeds, and other crops with greater tolerances to drought; transplanting nitrogen fixation ability from legumes to grains; development of commercially applicable hybrid soybeans; development of grains with greater resistance to cold, frost damage, insects, and lodging; and development of crops with naturally occurring herbicide and insecticide qualities. In some cases, these developments might substantially increase productivity per hectare, reduce total cost per unit, and somewhat reduce the sensitivity of crop production to adverse weather. If these developments materialize, they also would tend to increase surplus global grain availability and would create a challenge for policy makers in the development of incentives to increase the availability of food for undernourished persons in developing nations and in minimizing pressures for predatory trade practices by grain exporters seeking a larger share of a slowly growing world market.

Other possible biotechnology developments that would reduce the need for herbicides and insecticides might help to deal with growing concern in Europe and the U.S. about water pollution stemming from heavy use of agricultural chemicals in crop production. These developments also could lower per unit costs of crop production, thus tending to enlarge the world market for grains and oilseeds by making livestock-poultry-dairy diets more affordable to the developing world. If successful, such developments would create major growth opportunities in the plant breeding and seed industries, but likely would create a need for major additional restructuring and disinvestment in agricultural chemical and possibly nitrogen fertilizer industries.

Development of New Uses for Farm Products

Biotechnology also may offer future possibilities for expanded industrial use of agricultural crops, although these potential developments are largely speculative at this time. In the last two decades, developments in biochemistry, chemical engineering, and grain processing have led to the creation of new corn sweeteners and alcohol fuel industries and new uses of corn starch in industrial applications. While a negative impact on U.S. and world sugar demand has resulted from these developments, the demand for corn has been increased modestly. Recent research also has made it technically feasible to use vegetable oils as a dust suppressant in grain elevators and in other industrial and agribusiness uses. As another example, recent research by the Agricultural Research Service of the U.S. Department of Agriculture has resulted in the development of a bio-degradable plastic made from corn starch. The economics of commercial production are not yet clear, but it could result in additional demand for U.S. corn in the years ahead.[84] Future research conceivably could create additional new uses for grain and oilseed crops as raw materials in industrial processes and, at some future time, might make possible the development of entirely new crops to meet specific industrial needs. As one example of this, limited research currently is being conducted on possible industrial applications of new oilseeds not currently being grown on a commercial scale in the U.S. As with crop and livestock biotechnology research, it will be important to monitor new developments in this area. Creation of large new blocks of demand for farm products through research in processing and biochemistry is not anticipated in the near future, although important new developments could occur in the early part of the 21st century.

Because of the relative newness of biotechnology research in crop production, its potential impacts are largely speculative at this time. However, this is an area of research that agricultural policymakers and managers of farm input, production, and marketing firms will need to monitor closely in the years immediately ahead. Major scientific developments in this area could have profound impacts on global food trade, the structure of production agriculture, appropriate domestic and world trade policies, agribusiness firms, food security, and the ability of the world to meet the needs of people in developing nations whose diets are below minimum nutritional standards. Present indications are that biotechnology in crop production will not have major impacts on world agriculture before the turn of the century, although significant impacts in livestock production may well occur during the next decade and may impact on grain utilization and trade.

Notes

1. See Munich-Weihenstephan, "Objective Indicators of Large-Scale Food Shortages?" *Review of International Trade and Development* (Hamburg, Federal Republic of Germany), July-August 1981, pp. 178-182, for a discussion of objective measures of food security.

2. For a discussion of factors affecting grain stocks in United States, Canada, and Australia, see Carol A. Goodloe, "Grain Stock Policy in the U.S., Canada and Australia," U.S. Department of Agriculture, Economic Research Service, *North America and Oceania, Outlook and Situation Report*, RS 84-1 (Washington, D.C.), 1984, pp. 26-31.

3. Based on U.S. Department of Agriculture, Foreign Agricultural Service, "Rice Trade and Economy of Selected Asian Countries, 1970 to the Present," *Foreign Agricultural Circular, Grains*, FG 15-84 (Washington, D.C.), December 1984.

4. Based on U.S. Department of Agriculture, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-87 (Washington, D.C.), April 1987.

5. For oil and meal yields of various oilseeds, see U.S. Department of Agriculture, Economic Research Service, *U.S. Fats and Oil Statistics 1961-76*, Statistical Bulletin No. 574 (Washington, D.C.), June 1977, pp. 120-126.

6. S. Mielke, "World Supply, Demand and Competition for Soybeans and Products in the Eighties and Nineties," *World Soybean Research Conference-III, Proceedings*, edited by R. Shibles, Westview Press (Boulder, Colorado), September 1985, pp. 51-62.

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Appendix I. Classification of Countries by Economic Category

Appendix I. Classification of Countries by Economic Category.

Developed Market Economies

Australia
Austria
Canada
Denmark
Finland
West Germany
France
Iceland
Ireland
Italy
Japan
Luxembourg and Belgium
The Netherlands
Norway
Sweden
Switzerland
United Kingdom
United States

Centrally Planned Economies

Albania
Angola
Bhutan
Bulgaria
China
Cuba
Czechoslovakia
East Germany
Hungary
Kampuchea (Cambodia)
Korea (North)
Laos
Mongolia
Mozambique
Poland
Romania
South Yemen
USSR
Vietnam
Yugoslavia

Rapidly and Moderately Developing Nations

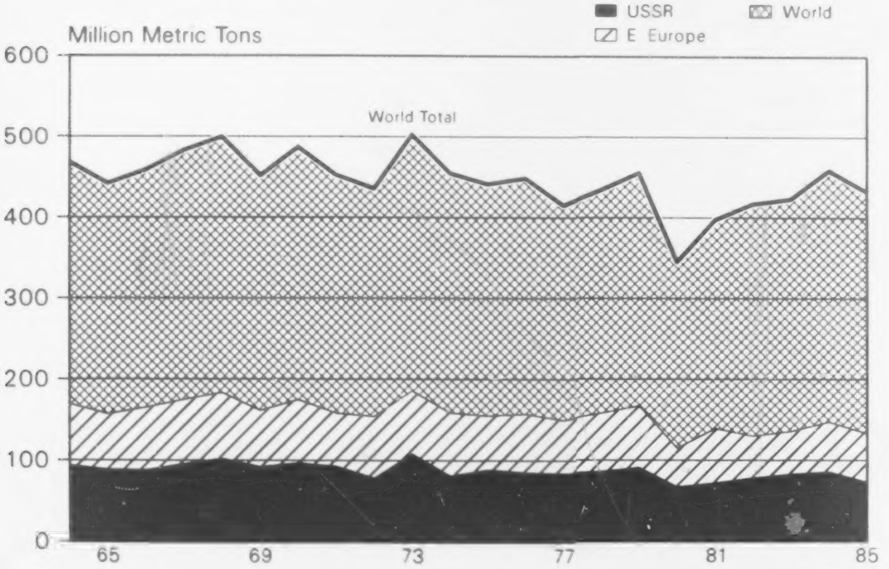
Algeria
Argentina
Bolivia
Brazil
Cameroon
Chile
Colombia
Congo
Costa Rica
Cyprus
Dominican Republic
Ecuador
Egypt
El Salvador
Ghana
Greece
Guatemala
Honduras
India
Indonesia
Iran
Iraq
Israel
Ivory Coast
Jamaica
Jordan
Korea (South)
Kuwait
Lenanon
Liberia
Libya
Malaysia
Mexico
Morocco
New Zealand
Nicaragua
Nigeria
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Portugal
Puerto Rico
Saudi Arabia
Senegal
Singapore
South Africa
Spain
Syria
Taiwan
Thailand
Trinidad
Tunisia
Turkey
Uruguay
Venezuela
North Yemen
Zambia
Zimbabwe

Other Developing Nations

Afghanistan
Bahamas
Bahrain
Bangladesh
Barbados
Benin
Botswana
Burma
Burundi
Canary Islands
Central African Republic
Chad
Comoros
Cape Verde
Djibouti
Dominica
Ethopia
Equatorial Guinea
Fiji
French Pacific Islands
French West Indies
Gabon
The Gambia
Grenada
Guinea
Guinea Bissau
Guyana
Haiti
Hong Kong
Kenya
Lee Wind Islands
Lesotho
Madagascar
Malawi
Maldives
Mali
Malta
Mauritania
Mauritius
Nepal
Netherland Antilles
Niger
Oman
Other West African
Qatar
Rwanda
St. Lucia
Sao Tome Principe
Seychelles
Sierra Leone
Solomon
Somalia
South Pacific Islands
Southwest African
Sri Lanka
Sudan
Surinam
Swaziland
Tahiti
Tanzania
Togo
Uganda
United Arab Emirates
Upper Volta
Western Samoa
Zaire

Appendix II. Potato, Cassava, and Pulse Production by Major Producing Areas

Appendix II. Figure 1. World Potato Production by Millions of Metric Tons by Major Producing Areas, 1965-85 Calendar Years.



Source: Food and Agriculture Organization of the United Nations. *Trade Yearbook* (Rome, Italy), various issues.

Appendix II, Table 1. Cassava Production in Major Producing Nations from 1973 through 1986 in Millions of Metric Tons.

Area or Country	1973	1979	1981	1983	1984	1985	1986
China	2.0	2.5	3.5	3.8	11.0	3.8	3.9
India	6.4	6.1	5.9	5.3	5.8	5.8	5.6
Indonesia	11.2	13.8	13.3	12.2	14.2	14.5	14.5
Philippines	0.5	2.3	2.3	2.0	2.0	2.1	2.3
Thailand	5.7	11.1	17.7	19.0	20.0	20.0	21.0
Others	0.4	0.4	0.5	0.5	0.5	0.5	N.A.
Far East Total[a]	26.1	36.1	43.2	42.7	46.5	46.8	N.A.
Ghana	1.6	1.8	1.7	1.7	4.1	2.4	3.5
Mozambique	2.5	3.0	3.2	3.2	3.2	3.2	2.5
Nigeria	9.6	10.5	11.0	10.0	11.8	13.0	14.7
Tanzania	3.8	5.1	6.0	5.4	5.6	5.5	5.4
Zaire	11.0	12.0	13.2	14.6	15.0	15.5	16.0
Others	12.5	13.6	14.8	16.1	16.7	17.1	17.9
Africa Total[a]	41.0	46.0	49.8	50.9	56.4	56.6	60.0
Brazil	26.5	25.0	24.5	21.6	21.3	23.0	24.0
Colombia	2.0	1.9	2.2	1.6	1.7	1.7	1.5
Others	3.5	4.1	4.2	4.2	4.5	4.5	5.5
Latin America Total[a]	32.0	30.9	30.8	27.3	27.1	29.2	31.0
World Total[a]	101.3	117.6	128.0	124.9	134.4	136.8	143.0

Source: Personal communication with officials of Food and Agricultural Organization of the United Nations, *Food Outlook*, No. 8, 1986 (Rome, Italy), September 1986.

[a] Totals may not add up due to rounding.

NA: not available

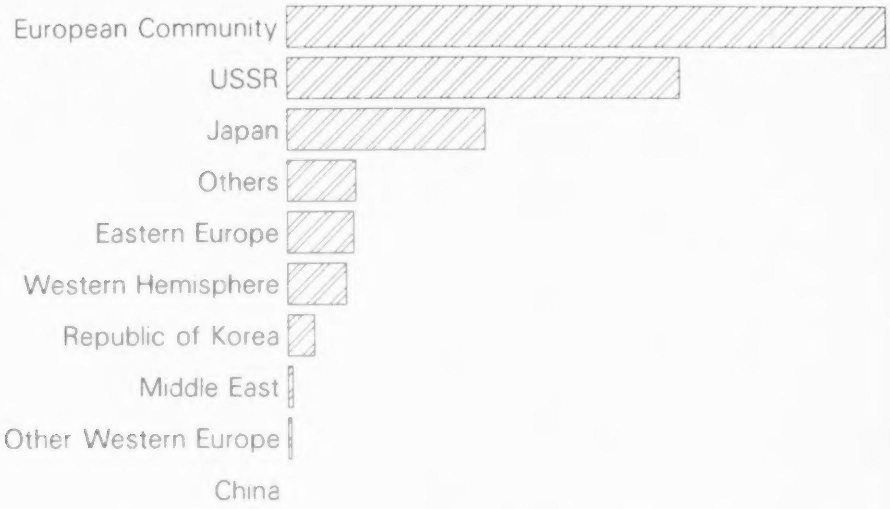
Appendix II, Table 2. World Pulse Production in Major Producing Areas, 1971-85, in Millions of Metric Tons.

Area or Country	1971	1973	1976	1978	1979	1980	1982	1983	1984	1985
Asia	21.4	20.7	22.9	22.4	22.2	19.9	22.2	23.7	23.7	24.0
Africa	4.5	4.7	5.8	5.6	5.7	5.4	6.0	5.5	5.4	6.0
C. America	1.6	1.6	1.3	1.7	1.5	1.6	1.8	1.9	2.1	1.9
S. America	3.4	2.9	2.6	3.0	3.2	2.7	3.8	2.4	3.4	3.5
N. America	1.1	1.0	1.1	1.3	1.3	1.7	1.7	1.1	1.3	1.5
W. Europe	2.2	2.0	1.6	1.8	1.8	1.9	1.9	2.1	2.8	3.3
E. Europe	1.0	0.8	0.6	0.8	0.7	0.8	1.0	1.0	1.4	1.3
USSR	6.9	8.4	8.7	7.8	4.3	6.4	6.5	8.2	7.1	7.9
Oceania	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.6	0.9
World Total	42.2	42.2	44.8	44.5	40.9	40.6	45.2	46.2	47.8	50.3

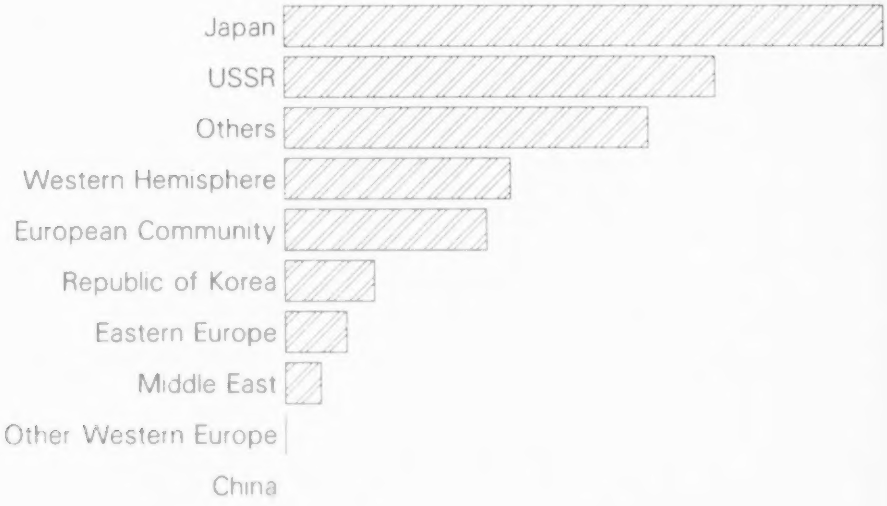
Sources: Food and Agricultural Organization of the United Nations (Rome, Italy), *Food Outlook* 1983, Statistical Supplement, March 1984 and February 1987.

Appendix III. Flow Patterns and Table Showing Destinations and Ports of U.S. Grain Exports in 1975-76 and 1985-86

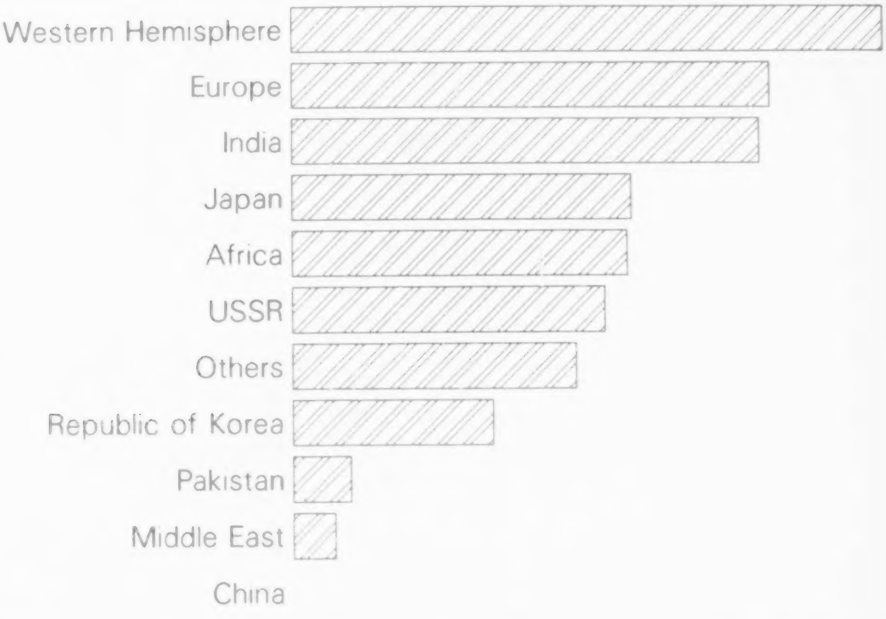
Appendix III. Figure 1. Relative Shares of U.S. Corn Exports to Major Foreign Destinations in 1975-76.



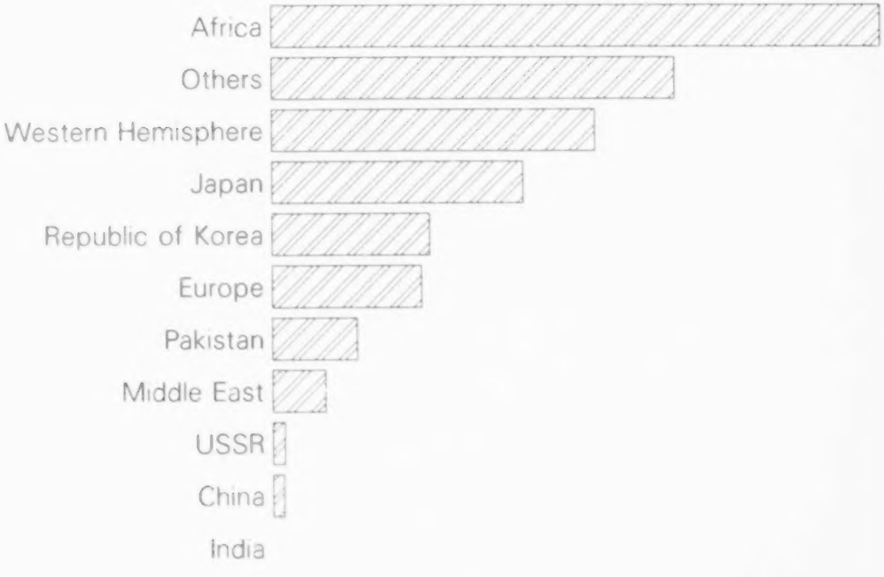
Appendix III. Figure 2. Relative Shares of U.S. Corn Exports to Major Foreign Destinations in 1985-86.



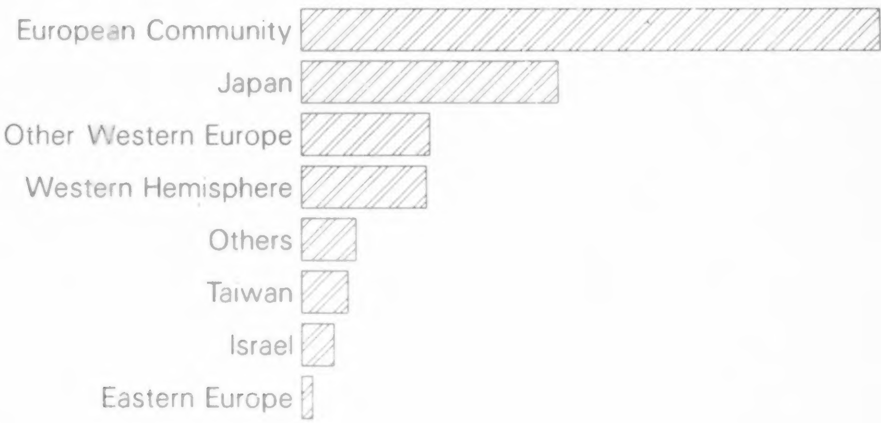
Appendix III. Figure 3. Relative Shares of U.S. Wheat Exports to Major Foreign Destinations in 1975-76.



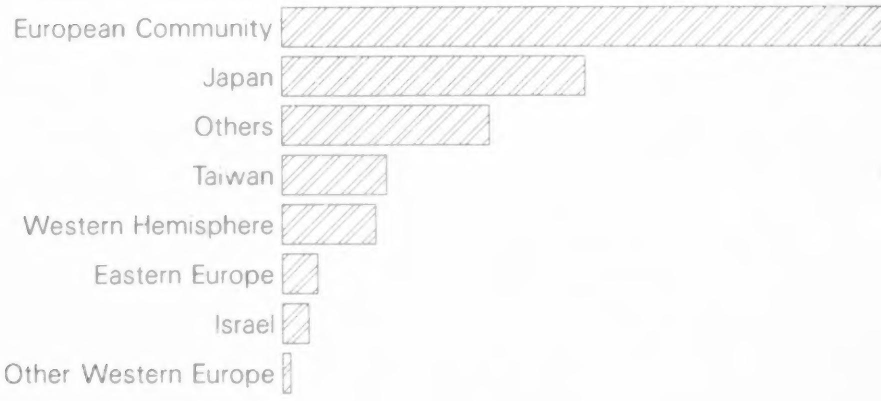
Appendix III. Figure 4. Relative Shares of U.S. Wheat Exports to Major Foreign Destinations in 1985-86.



Appendix III. Figure 5. Relative Shares of U.S. Soybean Exports to Major Foreign Destinations in 1975-76.



Appendix III. Figure 6. Relative Shares of U.S. Soybean Exports to Major Foreign Destinations in 1985-86.



Source U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues.

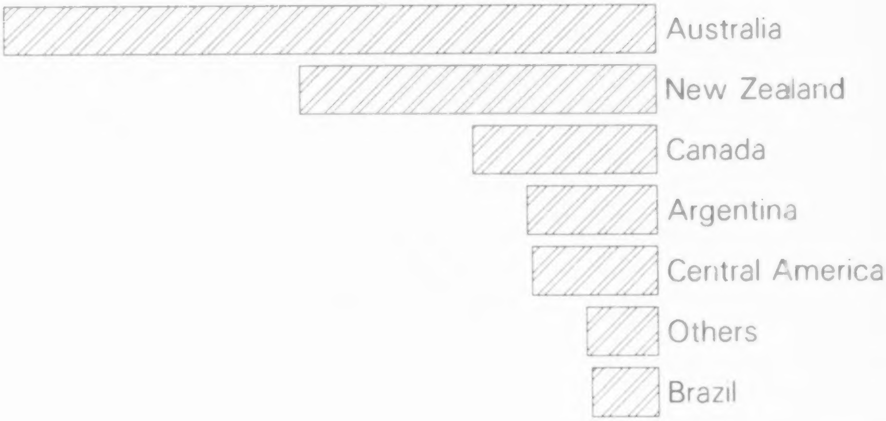
Appendix III, Table 1. U.S. Grain and Soybean Exports in Thousands of Metric Tons by Port Areas, October-September 1972-73 and 1985-86.

Commodity	Fiscal Year	Lakes	Atlantic	Gulf	Pacific	Interior	Total
Corn	1985-86	677.97	3,615.95	21,255.80	4,979.35	728.66	31,257.73
	1972-73	4,048.28	5,956.04	20,723.66	44.70	0	30,772.68
Wheat	1985-86	2,551.55	1,139.24	13,638.55	8,482.84	0	25,812.18
	1972-73	3,231.40	2,373.99	21,070.15	8,885.80	0	35,561.34
Soybeans	1985-86	789.46	1,720.63	16,671.84	505.99	467.01	20,154.93
	1972-73	1,840.79	1,232.60	9,630.48	0	0	12,703.87

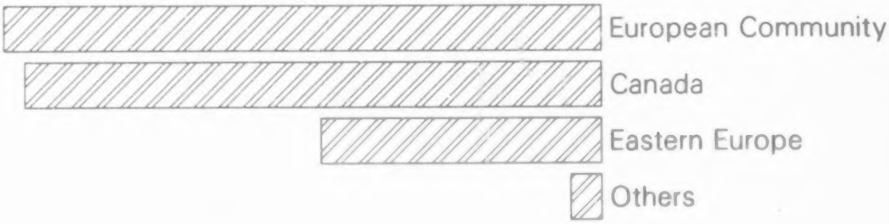
Source U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

Appendix IV. Flow Patterns Showing Sources of U.S. Pork and Beef Imports

Appendix IV. Figure 1. Relative Shares of Dollar Value of U.S. Beef and Veal Imports from Major Foreign Origins in 1985-86.



Appendix IV. Figure 2. Relative Shares of Dollar Value of U.S. Pork Imports from Major Foreign Origins in 1985-86.



Source: U.S. Department of Agriculture, Economic Research Service, Foreign Agricultural Trade of the United States (Washington, D.C.), November-December 1986.

Appendix V. U.S. Concessional Farm Product Exports by Commodities and Program Areas, 1977 and 1981-86 Fiscal Years

Appendix V, Table 1. U.S. Concessional Government-Financed Agricultural Exports by Commodities and Program Areas in Millions of Dollars, Fiscal Years 1977 through 1986.

Commodity and Fiscal Year (October-September)		PL-480 Title I Long Term Credit Sales	PL-480 Title II[a] Donations	Aid Mutual Security	Total[b] Government Programs	Concessional Program Exports as Percent of Total Exports
1986	Wheat and Flour	465.1	98.2	59.5	622.8	18.0
	Corn	12.5	10.9	47.1	70.4	2.1
	Soybean Oil	21.5	79.6	2.0	103.2	35.4
	Cotton (exc. linters)	6.2	0.0	0.0	6.2	0.9
	Milk-Nonfat Dry	0.0	92.0	0.0	92.0	41.8
	Others	83.9	227.4	22.8	334.1	1.8
1985	Wheat and Flour	522.2	125.0	11.1	658.2	14.9
	Corn	19.9	38.6	54.6	113.0	2.0
	Soybean Oil	78.0	139.2	4.0	221.1	39.6
	Cotton (exc. linters)	9.1	0.0	0.0	9.1	0.5
	Milk-Nonfat Dry	0.0	126.8	0.0	126.8	72.0
	Others	94.5	424.3	20.1	538.9	2.9
1984	Wheat and Flour	525.5	55.3	0.0	580.8	8.6
	Corn	53.3	20.4	92.3	166.0	2.4
	Soybean Oil	76.9	98.5	0.4	175.8	27.8
	Cotton (exc. linters)	12.4	0.0	0.0	12.4	0.5
	Milk-Nonfat Dry	0.0	34.8	0.2	35.0	18.8
	Others	94.5	191.8	10.8	297.2	1.4
1983	Wheat and Flour	472.1	159.6	29.8	661.5	10.6
	Corn	75.3	10.2	47.5	133.0	2.3
	Soybean Oil	87.0	48.5	0.0	135.5	29.3
	Cotton (exc. linters)	9.4	0.0	0.0	9.4	0.6
	Milk-Nonfat Dry	0.0	12.8	0.0	12.8	8.7
	Others	154.5	59.7	52.5	266.8	0.8
1981	Wheat and Flour	495.1	83.0	0.0	578.0	7.2
	Corn	78.3	30.9	57.0	166.3	2.1
	Soybean Oil	73.3	96.6	0.0	169.9	38.5
	Cotton	3.2	0.0	0.0	3.2	0.1
	Milk-Nonfat Dry	0.0	34.5	0.0	34.5	58.7
	Others	123.0	241.3	84.3	449.1	1.8
1977	Wheat and Flour	386.9	82.4	57.0	526.3	17.5
	Corn	44.8	5.5	142.3	192.6	2.5
	Soybean Oil	69.3[d]	23.9	31.0	124.2	22.0
	Cotton	18.0	0.0	0.0	18.0	1.2
	Milk-Nonfat Dry	0.0	81.5	0.0	81.5	99.8
	Others	240.8	148.7	188.7	578.2	4.2

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1987 and various other issues.

[a] Donations include voluntary relief agencies, the World Food Program, foreign donations, and government-to-government donations.

[b] May not add due to rounding.

[c] Mutual Security shipments estimated from the relationship between corn and feed grain exports.

[d] Title I shipments estimated from the relationship between soybean oil and soybean and cottonseed oil exports.

Appendix V, Table 2. U.S. Concessional and CCC Financed Agricultural Exports in Millions of Dollars, Fiscal Years 1979 through 1986.

	Fiscal Year Ending September 30						
	1979	1981	1982	1983	1984	1985	1986
Total Concessional Programs (from Appendix IV, Table 1)	1,490.1	1,401.0	1,089.8	1,219.0	1,267.2	1,667.1	1,228.8
CCC Programs:							
GSM-101	63.2	118.6					
GSM-102 (credit guarantees)		1,743.6	1,386.5	3,420.2	3,172.7	2,709.6	2,415.8
GSM-102 (blended credit)				648.9	473.0[a]	51.5	
GSM-103							7
GSM-5 (interest-free loans for blended credit)							
GSM-201 (breeding stock loans)							
Total CCC Programs	63.2	1,862.2	1,386.5	4,069.1	3,646.3	2,761.1	2,416.5
Total Concessional and CCC Programs	1,553.3	3,263.2	2,476.3	5,288.1	4,913.5	4,428.2	3,645.3
Concession and CCC Programs as Percent of Total U.S. Agricultural Exports	4.9	7.5	6.3	15.2	12.9	14.2	13.8

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, (Washington, D.C.), January-February 1987 and various other issues. U.S. Department of Agriculture, Foreign Agricultural Service, *Summary of Exports GSM-101, GSM-102, GSM-201, GSM-301*, unpublished material (Washington, D.C.), December 1982, and *Notice to recipients: Summary of FY 83, FY 84, FY 85, and FY 86 Export Values and Quantities* for GSM-102, GSM-103, and blended credit, unpublished material (Washington, D.C.), September 1983, January 1985, February 1986, and May 1987.

[a] Extra GSM-102 used for the blended credit program.

Appendix VI. World Milk Production, 1968-87, by Major Producing Regions

Appendix VI, Table 1. World Milk Production, 1968-1987 by Major Producing Areas in Millions of metric tons.

	Ave. 1968-72	1973	1976	1981	1982	1983	1984	1985	1986	1987
U.S.	53.4	52.4	54.3	60.2	61.5	63.4	61.4	65.2	65.8	64.2
EC-12	94.0	97.8	97.9	104.9	108.2	118.2	116.2	114.6	115.4	113.9
USSR	82.6	88.3	91.8	88.9	91.0	96.5	97.9	98.6	101.0	102.0
Eastern Europe	31.7	34.7	35.7	40.2	39.6	42.1	43.7	43.5	42.6	42.2
India	21.7	23.1	23.7	14.0	14.9	16.0	17.1	19.0	20.1	21.2
Other Western Europe	21.6	22.1	22.3	22.5	22.8	16.3	16.6	16.4	16.1	15.9
Brazil	7.3	7.2	8.5	10.5	10.1	10.7	10.8	10.4	9.8	10.8
New Zealand	6.2	6.0	5.7	6.7	6.8	6.9	7.6	7.9	8.2	8.0
Australia	7.3	7.3	7.0	5.3	5.4	5.7	6.1	6.3	6.2	6.2
Canada	8.2	7.7	7.6	8.0	8.3	7.9	8.1	7.9	7.9	7.9
Total[a]	334.1	346.6	354.5	361.2	368.6	383.5	385.5	389.7	393.1	392.2

Sources: U.S. Department of Agriculture Circular, *Dairy, Livestock and Poultry*, FD 2-86 (Washington, D.C.), November 1986, FD 1-86, May 1986, FD 1-85 March 1985 and FD 6-76 December 1976.

[a] Total may not add up due to rounding.

Appendix VII. Long-Term Trends in Wheat and Coarse Grain Production for Selected Regions and Nations

Appendix VII, Table 1. Long-Term Trend in Grain Production for Selected Regions and Nations in Millions of Metric Tons.[a]

	1895	1903	1913	1923	1933-34	1935-39	1955	1963	1973	1983	1984	1985	1986
Australia	83	50	2.89	3.72	4.77	5.05	6.40	10.12	14.80	10.95	26.89	24.51	21.42
Argentina	3.46	6.61	10.19	14.03	14.82	14.20	11.54	14.52	10.02	24.21	21.67	24.94	21.63
Canada	2.66	3.04	7.79	14.93	8.85	10.62	22.95	25.41	36.58	47.21	42.73	38.52	43.54
Eastern Europe	21.76	24.42	27.97	24.77	34.23	29.15	N/A	23.41	68.88	87.54	83.31	93.87	86.48
India	6.95	8.10	12.98	15.23	14.17	10.81	13.44	17.76	32.92	46.04	52.59	55.67	53.57
Mexico	2.10	2.79	2.36	3.16	2.32	2.19	4.04	8.29	2.02	11.62	12.91	14.72	14.82
China	N/A	N/A	N/A	N/A	N/A	14.21	N/A	N/A	62.97	135.62	156.50	166.84	154.48
North Africa	3.20	4.20	4.90	6.92	6.85	7.38	9.30	9.83	10.20	12.97	11.24	12.88	15.24
South Africa	N/A	N/A	95	98	1.96	2.47	4.13	5.20	12.97	6.50	6.20	9.98	10.17
Turkey	1.84	1.66	1.44	N/A	2.71	3.69	8.01	7.89	8.00	13.80	13.30	13.30	12.70
USA	69.24	77.23	86.80	84.74	77.52	84.65	118.18	143.78	199.03	295.70	182.98	278.59	304.00
USSR	18.07	25.00	39.58	12.30	41.34	47.32	N/A	66.12	178.04	140.50	145.00	127.60	143.70
Brazil	N/A	N/A	N/A	3.99	N/A	5.46	6.98	7.70	16.93	21.35	23.10	23.90	23.30
Western Europe	28.22	34.75	36.42	35.59	44.69	41.60	51.98	74.80	115.73	145.26	140.28	173.67	160.39
World Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	848.25	1082.13	1005.39	1145.15	1158.84

Sources: U.S. Department of Agriculture, *Yearbook* (Washington, D.C.), 1899, 1907, 1915, 1925, 1935; Sanford Evans Statistical Service, *Grain Trade Yearbook* (Winnipeg, Canada), 1954-55, 1957-58; and U.S. Department of Agriculture, *Agricultural Statistics*, 1965, 1974, 1985.

[a] Wheat, corn and barley

[b] Wheat and barley

[c] Wheat

[d] Wheat and corn

[e] Eastern Europe up to 1913 includes Austria which used to be part of Austria-Hungary. Corn production for East Germany up to 1935-39 are estimated. Barley and wheat production for East Germany up to 1933 are estimated.

[f] Corn and barley

[g] Corn

N/A—not available

Appendix VII, Table 2. Long-Term Trend in Net Exports of Grains for Selected Regions and Nations, in Millions of Metric Tons.[a]

	1903	1913	1923	1933-34	1934-38	1955	1963	1973	1983	1984	1985
USSR	4.81	7.23	−.10	1.61	95	2.60	2.37	−17.22	−27.47	−38.75	−39.17
China	N/A	02	−.59	−2.20	−1.00	03	−4.57	−6.49	−17.96	−12.66	−2.90
Brazil	−.17	−.44	−.60	−.91	−.92	−1.69	−2.22	−2.99	−4.35	−4.67	−3.95
Japan	−.08	−.17	−.40	−.10	−.46	−3.21	−6.01	−14.44	−21.70	−20.24	−19.83
Egypt	−.00	−.06	−.03	01	00	00	N/A	−.07	−1.40	−1.58	−1.91
Mexico	−.01	−.04	−.09	00	03	05	−.45	−1.17	4.60	−2.58	−1.76
Australia	03	1.17	1.40	2.42	2.11	2.01	5.07	6.44	16.66	13.74	20.89
Argentina	3.79	7.66	7.11	10.02	10.08	4.50	4.34	6.88	17.07	12.91	16.79
Canada	18	3.61	7.48	5.27	4.23	6.48	11.45	15.32	28.09	25.58	19.42
Eastern Europe	98	1.80	69	2.29	2.41	−3.33	−4.43	−4.82	−6.01	−3.51	−.80
India	1.32	1.60	67	00	19	−.44	−4.08	1.83	−3.22	−1.81	−.45
USA	2.68	2.99	8.32	94	09	9.88	32.32	73.41	90.04	94.37	75.97
South Africa	N/A	−.15	−.03	03	32	47	2.20	1.66	05	−2.48	−.37
Western Europe	−14.94	−20.58	−21.71	−20.30	−18.97	−15.29	−19.25	−17.58	2.83	15.56	16.70

Sources: U.S. Department of Agriculture, *Yearbook* (Washington, D.C.), 1907, 1915, 1925, 1935; Food and Agriculture Organization of the United Nations, *FAO Trade Yearbook* (Rome, Italy), 1958, 1966, 1972, 1973, 1974, 1975, 1984, 1985.

[a] Wheat, corn and barley

[b] Wheat and barley

[c] Wheat

[d] Wheat and corn

[e] Corn and barley

[f] Corn

[g] Barley

[h] Eastern Europe up to 1913 includes Austria, which used to be part of Austria-Hungary. Corn and wheat trade for East Germany up to 1934-38 are estimated.

N/A—not available

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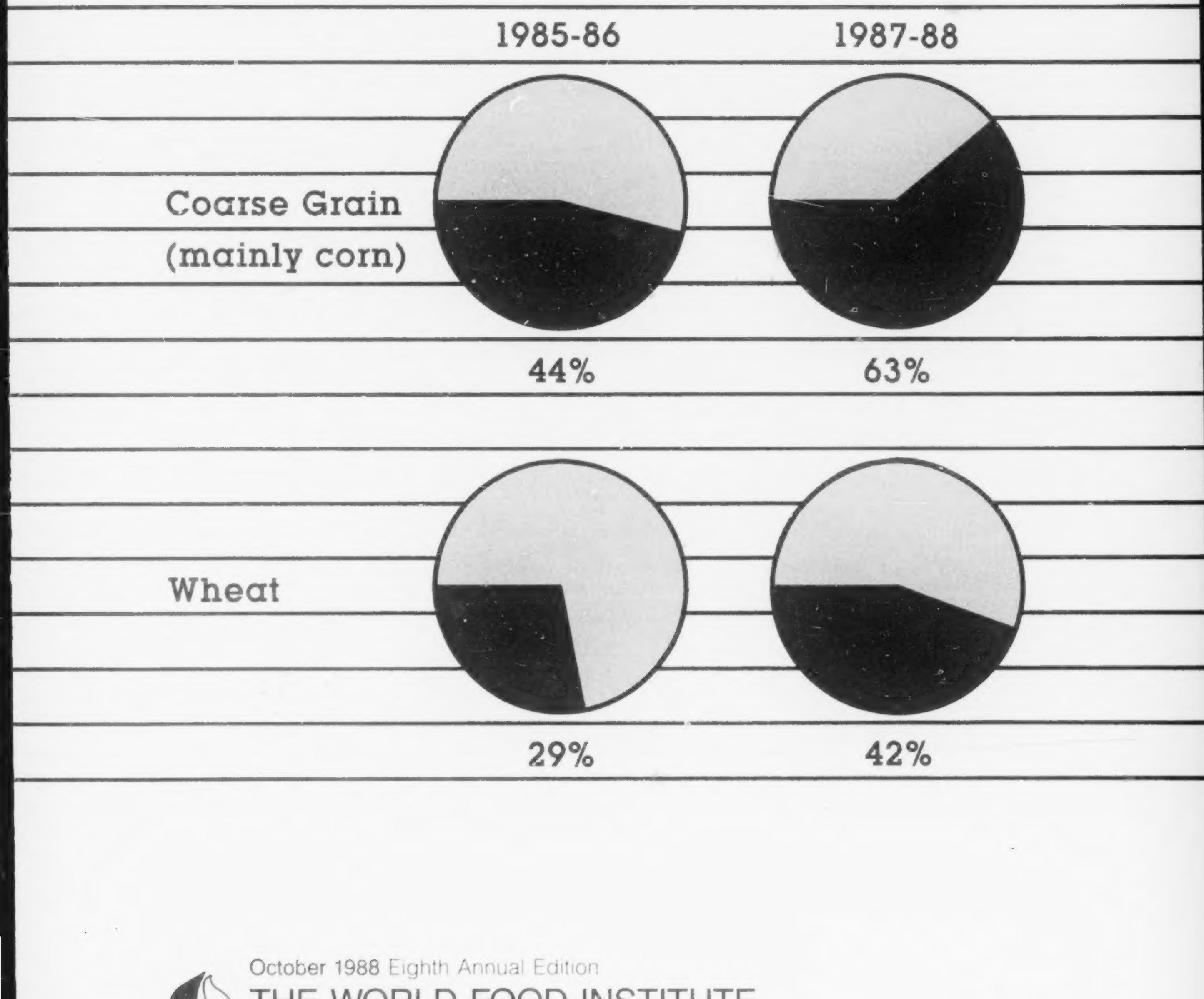
World Food Trade and U.S. Agriculture, 1960-1987

U.S. Share of World Exports



October 1988 Eighth Annual Edition

THE WORLD FOOD INSTITUTE
Iowa State University Ames, Iowa

Abstract

World grain and oilseed production dropped moderately below utilization in 1987-88, leading to the sharpest decline in global grain carryover stocks on record. Adverse weather in several countries and aggressive U.S. land-idling programs accounted for much of the decline in stocks. However, grain stocks in mid-1988 still were moderately above minimum acceptable levels needed for world food security. Changing U.S. policies, including lower price support levels and an aggressive Export Enhancement Program, along with a weaker U.S. dollar, generated substantially increased U.S. shares of world grain exports and moderately increased U.S. oilseed export shares. Continued U.S. and EC export subsidies and radically changed U.S. farm policies are important elements of the world food trade environment. Various groups of nations have developed their positions for GATT negotiations. GATT discussions will focus on ways of multilaterally reducing agricultural subsidies in major producing nations, as well as on ways of reducing barriers against agricultural imports. Other appropriate agricultural policies might deal with causes of slow growth in the world economy and agricultural trade, and enhancement of global food security.

Key Words: Grain, oilseeds, corn, soybeans, wheat, agricultural exports, global food, world agricultural trade, U.S. trade, trade policies, agricultural imports, Soviet grain imports, Chinese grain trade, world livestock production, GATT.

By Robert N. Wisner, professor of economics, and Hamid Tabesh, post-doctoral research associate, Department of Economics. Edited by Merlin Pfannkuch.

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Foreword

In the eighth edition of *World Food Trade and U.S. Agriculture, 1960-1987*, the authors note that world production of grains and related food and feed commodities declined in 1987-88, while a small increase in utilization occurred. As a result, the world grain stocks decreased by 12 percent (or about 57 million metric tons). World grain exports continued to rise and the U.S. continued to regain its shares of wheat and coarse grain exports, in part due to its farm policies and aggressive use of export subsidies. The world economy is expected to continue growing at only a modest rate because both developed and developing countries have large public and private debts.

Global stocks of grain in 1987-88 have been reduced, but still are large enough for generally accepted standards of minimal global food security. Reduction in U.S. stocks, however, accounted for about 50 percent of the decline in global stocks. While food stocks generally are held largely by developed countries, the food consumption per person in developing countries has been falling. The World Food Council, at its fourteenth ministerial session in Cyprus at the end of May 1988, recommended, unanimously, that a "Cyprus Initiative Against Hunger in the World" be launched to recommend a course of action to combat hunger more effectively. The Council members noted that social concerns have increased in many countries. As a result, countries are seeking ways to protect their food security and the well-being of their low income populations. Emphasis on technical cooperation among developing countries (TCDC) was reaffirmed. In addition, developed countries were urged to provide appropriate financial and technical support to the TCDC efforts.

Increasing economic interdependence among nations of the world brings considerable pressure to bear on agricultural and trade policies. At the same time, access to food in the world's poorest nations in the face of adequate supplies seems to be as serious a problem now as food scarcity was in the 1970s.

In light of uncertainty about the size of the 1988-89 grain crops due to drought in the U.S. and Canada, some key questions important for decisions by U.S. and foreign policy makers, producers, and agribusiness managers are addressed. This report also provides historical perspectives and background information necessary to understand the interdependence of U.S. agriculture and the world economy.

The World Food Institute of Iowa State University is pleased to publish the eighth annual edition of *World Food Trade and U.S. Agriculture, 1960-1987*. As in previous editions, its purposes are: (1) to disseminate a comprehensive but understandable picture of the world food situation, the role of U.S. agricultural exports in world trade, and the impact of trade on U.S. agriculture; and (2) to identify emerging issues that will influence U.S. and world agricultural trade. It is intended to serve as a resource for scholars and citizens, producers and consumers, policy makers, and others who are concerned with alleviating the world's food problems.

Your comments about this edition and suggestions for future editions of World Food Trade and U.S. Agriculture are solicited. Please send them to me or to Dr. Robert Wisner.

Charlotte E. Roderuck, Director
World Food Institute
Iowa State University
7/7/88

Summary and Implications

The trade year 1987-88 provided the first major test of whether dramatically changed U.S. agricultural policies are working to accomplish their intended purposes of increasing U.S. farm income and regaining lost U.S. shares of global exports. A sharp increase in U.S. exports of most major commodities in physical volume and moderately increased export values along with an expected record U.S. net farm income in 1988 suggest that the policy changes implemented in mid- to late 1986 are working. However, part of the increase in U.S. exports and export shares also is due to serious weather problems in 1987 in several important crop producing areas including the Southern Hemisphere, Eastern Europe, and the Indian subcontinent. Weather-restricted production in these areas may be a temporary development in the U.S. and world agricultural situation. Other important elements in the 1987-88 world agricultural situation include continued large costs of agricultural price and income support programs in the U.S., the European Community (EC), and Japan (although U.S. farm program costs are declining substantially), declining world grain carryover stocks for the first time in several years, increasing global trade in farm products, worsening food shortages in parts of Africa, and strong pressure by the U.S. to end agricultural subsidies by the turn of the century through current General Agreement on Tariffs and Trade (GATT) negotiations.

Declining world grain and oilseed carryover stocks are due to a combination of slightly increased global utilization, reduced grain area harvested, and one of the largest year-to-year declines in world grain production in recent times. Global utilization of all grains in 1987-88 is estimated to have increased by a very modest 0.4 percent, thus reflecting a modest decline in per capita grain utilization. Utilization is estimated to have decreased slightly in Australia, Eastern Europe, and India, with only partially offsetting increases in the U.S., the USSR, China, and other nations. Growth in world grain utilization was slowed by tightening domestic supplies in countries experiencing serious 1987 weather problems, slow economic growth in some areas, already high levels of per capita grain consumption in the U.S. and the EC, and dietary trends in the U.S. World grain production in 1987-88 declined by about 5 percent, the largest one-year decline in at least 25 years and exceeding the 4 percent decline in 1983-84. A reduction in the total harvested grain area of 3.5 percent from the previous year accounted for a significant part of the decline in world grain production. One-third of the decline in global area harvested was due to aggressive U.S. government short-term and long-term land-idling programs, with the remainder reflecting reduced plantings due to drought and depressed world grain prices. The U.S. cropland area idled by government programs in 1988 exceeded the entire cropland area of France and Spain. Reduced plantings brought world harvested grain area to the lowest level since 1972-73 and 6.4 percent below the peak 1981-82 level. An important area of uncertainty for agricultural producers and agribusiness firms is the speed with which recently idled cropland may return to production in response to the recent sharp increase in world grain prices. The U.S. has recently made changes in its government wheat production control program to sharply increase 1989-90 plantings, and similar changes may be made in its 1989-90 feedgrain program. In addition, improved weather and crop prices may encourage foreign producers in some areas to plant recently idled marginal cropland.

World grain trade continued to expand in 1987-88, with the growth rate accelerating moderately from the previous year. Global exports of all grains rose by an estimated 5.7 percent, up from the 1986-87 growth rate of 3.3 percent. Increased trade reflected growing demand in Pacific Rim nations, 1987 Soviet wheat production problems, reduced production in several other important importing nations, and heavily subsidized exports of wheat and barley by the U.S. and the EC. Despite the accelerated recovery in export growth, combined world exports of all grains in the 1987-88 trade year remained 10 percent below the 1984-85 record level.

With substantially reduced production and slightly increased utilization, global grain carryover stocks at the end of 1987-88 recorded the largest absolute decline on record. Preliminary data indicate global stocks fell by 57 million metric tons, modestly exceeding the 52.4 million ton decline of 1983-84 when global stocks were reduced sharply as a result of aggressive U.S. land-idling programs and a severe U.S. drought. At the global level, grain carryover stocks declined by an estimated 12 percent from the previous year. Other years of large declines in global carryover stocks in the previous two and one-half decades included decreases of 15 percent in 1983-84 and 1970-71 (the year of the U.S. corn blight), 16 percent in 1972-73, and 19 percent in 1965-66. Despite sharply declining stocks, the world grain carryover at the beginning of the 1988-89 trade year at approximately 24 percent of annual utilization is modestly above generally accepted standards for minimum food security needs. While U.S. agricultural price support and trade policies have changed dramatically since early 1986, the U.S. is continuing to play a large role in balancing changes in globally available grain supplies with global needs. About 50 percent of the reduction in world grain carryover stocks in 1987-88 was due to a decline in U.S. carryover stocks as old-crop supplies were moved into commercial channels to meet domestic and export needs.

Because of sharply below normal precipitation in the spring and summer in the major grain and oilseed producing regions of the U.S. and Canada, global grain production and supply prospects for 1988-89 are more uncertain than usual. The U.S. and Canada normally produce about one-fifth of the world's total grain crop. Early indications are that world grain exports may show relatively little growth in 1988-89, due to increased production in several important importing nations. The trend in carryover stocks and prices, however, will depend heavily on the outcome of North American grain and oilseed crops.

U.S. shares of global exports of most of its major agricultural products increased substantially in 1987-88. Increased U.S. export shares reflected aggressive U.S. export subsidies and government export assistance programs for wheat, barley, sorghum and vegetable oils, reduced supplies in some other exporting nations, and large U.S. reserve stocks that were readily available to move into export markets as global import demand increased. However, drought-reduced supplies may reduce the U.S. share of global grain exports somewhat in 1988-89.

Longer-term economic indicators, including fiscal and monetary policies of industrial nations and continued public and private debt burdens in developing and developed nations, suggest the world economy will grow at a modest rate during the next few years but with much slower growth than in the 1970s. That, along with limited inflation and moderate energy costs, should encourage modest growth in world utilization and exports of farm products. However, the growth rate may be moderated by lower incomes and foreign exchange earnings of oil exporting nations than in the 1970s and early 1980s. In 1986-87, almost one-third of U.S. corn exports (including those sold to the USSR) and two-fifths of U.S. wheat exports went to petroleum exporting countries. Unless major weather problems continue over a wide area, the emergence of new crop production technology and wider application of currently available technology appear likely to maintain the long-term upward trend in global crop production through the mid-1990s.

These prospects indicate that competition in world grain markets is likely to remain substantial for the next few years. In the current world economic environment, grain exporters are facing strong pressures to maintain or expand their respective shares of world trade in order to maintain incomes of farmers and reduce the cost of government farm programs. Similar pressures also exist in world markets for livestock, dairy, and poultry products, as well as industrial goods. The net effect has been the emergence of one of the strongest predatory and protectionist trade environments since the late 1920s and early 1930s, with some danger that major farm product exporters will slip into a prolonged and expanded trade war that could spill over into industrial products. Evidences of this environment include aggressive export subsidies and export enhancement programs by the U.S. and the EC, threats of import restrictions to be imposed by the U.S., the EC, Canada and other nations, strong negative sentiment toward industrial product imports into the U.S. and major concern in the U.S. Congress about the large U.S. trade deficit.

This environment creates a need for caution in implementing policy changes related to trade and export subsidies. The lessons of the 1930s are a reminder that protectionist trade practices can lead to shrinking global export markets and declining global economic activity. Similarly, the current export subsidy war carries the potential danger of downward pressure on world farm product prices with a return of favorable weather conditions and less aggressive U.S. land-idling programs.

The current world agricultural situation and prospects for the next few years suggest that an immediate return to the agricultural environment of the 1970s is unlikely. Instead, several more years may be required to bring equilibrium in the world supply and demand for major agricultural products. However, the sharp downward trend in U.S. agricultural export volumes appears to have ended as a result of sharply reduced U.S. price support levels, U.S. export expansion programs, and modest growth in the world economy. Lower U.S. prices and a moderate exchange rate of the U.S. dollar against foreign currencies should at least slightly improve the competitiveness of American farm product exports in the next few years. This trend also appears likely to be reinforced by a gradually expanding world economy in the late 1980s and early 1990s.

In dealing with U.S. and global agricultural problems and in formulating appropriate policies, important linkages between agriculture and the general economy should be recognized. Trade is a two-way relationship in which one partner's purchases generate revenue to provide purchases and trade flows in the opposite direction. For example, clothing that U.S. consumers buy from southeast Asia or oil purchased from Mexico provide foreign exchange those nations can use to buy U.S. farm products. The size of the resulting purchases is influenced by the health of the U.S. and world economy, exchange rates, interest costs and their impacts on foreign nations, and a number of other factors. Sustained improvement in the U.S. and world agricultural economic environment will require monetary and fiscal policies aimed at stabilizing currency exchange rates and interest rates at realistic levels, promoting sustained economic growth, and assisting developing nations in dealing with debt problems.

Even in a setting of adequate global food supplies, food shortages remain a serious problem in the world's poorest nations and especially in parts of central Africa. Food security in a sizable part of the developing world thus is still an important agricultural policy issue and should not be overlooked when dealing with the problems of agricultural abundance in developed nations.

Introduction

In mid-1987, global grain exports moved into a moderate expansionary phase after two years of being below the long-term upward trend. The expansion appears likely to continue over the next few years, after a possible temporary interruption in 1988-89 due to widespread U.S. drought. The recently accelerated growth in world grain trade stems from increased imports in several nations that experienced adverse weather and reduced crop production in 1987, and slightly accelerated world economic growth. Countries and areas with modestly increased import demand for grain included Korea, Taiwan, several Middle East and North African countries, Japan, Eastern Europe, and a few Latin American nations. Moderate growth in world exports, reduced grain production by several exporting nations, and a dramatic shift to more aggressive U.S. export policies permitted the U.S. in 1987-88 to regain a substantial part of its global export shares lost during the first half of this decade. At the same time, large-scale U.S. land-idling programs, large government farm program payments, relatively stable input costs, rising grain and oilseed prices, and improved livestock feeding returns are bringing a sharp recovery in 1988 U.S. farm income, although incomes of some U.S. producers and the financial condition of some U.S. agribusiness firms will be adversely affected in 1989 by the 1988 drought.

At the world level, grain utilization is continuing the long-term upward trend that has been in place for two and one-half decades, except for a one-year decline in 1974-75. However, the recent pattern of increased self-sufficiency in several importing nations is being maintained. While competition from non-U.S. grain exporters diminished in 1987-88, most major shifts in trade patterns of recent years are continuing. The European Community (EC) has retained its recently acquired position as a net coarse grain exporter and is a major wheat exporter, along with modest net wheat exports from Saudi Arabia and a few other former importing nations. China's coarse grain exports have declined modestly since 1985-86, although it still is expected to be a net exporter for the 1987-88 season. India and Pakistan returned to their former positions as wheat importers in 1987-88 due to a drought-reduced grain harvest. In addition, India was a net importer of corn for the first time in decades, due to its severe 1987 drought. Production of grains also declined in Eastern Europe in 1987 as a result of unfavorable weather, thus reducing exports and increasing imports by that region. The expected temporary nature of these problems, along with sluggish growth in demand for livestock products in Western Europe, the recent expansion of the EC to include Spain and Portugal, and continuing global debt problems suggest that competition in world food trade is likely to remain relatively strong for the next few years.

In the trade policy area, the U.S. and the EC moved into a full-scale trade subsidy war in 1987-88, with the U.S. at times offering discounts of up to $1.25 per bushel ($46 per metric ton) or more under its wheat Export Enhancement Program along with large discounts on barley, sorghum, and vegetable oils. These programs have been extended to a wide range of importing nations including China, the USSR, and several Middle East, North African and Eastern European countries. Trade subsidies were an important factor in the sharply increased U.S. shares of global trade, although their cost has been substantial. Large government program costs to the U.S. and the EC and negative impacts on other exporters have created conditions that may foster constructive GATT (General Agreement on Tariffs and Trade) negotiations to deal with the current trade and agricultural policy problems. The U.S. and the EC likely will be motivated to negotiate seriously in areas related to export subsidies because of burdensome domestic farm program costs. In addition, changing EC attitudes toward small-scale land-idling programs may make that a viable EC farm policy tool in the years ahead. Other agricultural exporters have suffered negative impacts on their farm sectors from recent U.S. and EC subsidies and also are likely to be interested in negotiating more satisfactory procedures for resolving agricultural trade problems.

With serious weather problems in several non-U.S. grain producing areas in 1987-88, world carryover stocks of grains and oilseeds declined sharply in the trade year just ending. A further decline in global stocks appears likely in 1988-89, as a result of widespread drought in the U.S. and Canada. However, carryover stocks are still expected to be slightly above minimum levels needed for food security. A significant part of the decline in 1987-88 stocks also was due to reduced grain area harvested, as a result of expanded U.S. government land-idling programs, voluntary idling of some marginal land in foreign nations due to low crop prices, and higher-than-normal abandonment of planted area as a result of drought.

Despite fully adequate global food supplies, serious food problems remain in several sub-Saharan African nations.

In this setting, several key questions remain important for U.S. and foreign policy makers, producers, and agribusiness managers as they plan for future farm programs and investment strategies. Key questions include:

1. Will foreign grain and oilseed producers respond to the recent sharp rise in world prices for major crops by increasing area planted and use of major inputs such as fertilizer in the next few years?

2. What forces may work to increase world demand and grain trade in the years immediately ahead, and what rate of growth is realistic for planning purposes?

3. What will be the longer-term global supply and demand for farm products with a continuation of current economic and trade policies?

4. Will the upward trend in U.S. shares of global grain and oilseed exports that began in 1986-87 continue in future years?

5. Will U.S. land-idling programs be eased in the next few years as a result of the sharp decline in U.S. and world grain carryover stocks?

6. What U.S. and world economic policies are appropriate in dealing with the problems of sluggish growth in global agricultural trade, food security, and international debt?

7. What impact will biotechnology have on future production and trade patterns?

8. What is the GATT organization and what can be expected from the GATT negotiations in the next few years?

This report brings into focus the complex linkages between U.S. agriculture and the world economy, and traces the impacts of the current world food situation on U.S. farm product exports. It also outlines major causes of the strong competition in export markets and provides historical perspective on the development of that competition. Information is provided to at least partly answer the key questions noted above, and to identify relationships of U.S. agriculture and agribusiness with the world financial system, energy prices, currency exchange rates, and domestic economic and trade policies of other nations.

1987-88 World Food Situation: Reduced Production, Increased Trade, Declining Stocks, and Higher Prices

The world food situation in 1988 reflects partial relief from the financial stresses on global agriculture of the last few years, although serious problems remain among some U.S. and foreign producers and agribusiness firms. World grain production declined by an unusually large 5 percent in 1987-88 as a result of weather problems in several nations and large-scale U.S. land-idling programs. This was the largest percentage decline in two and one-half decades. At the same time, 1987-88 world grain trade increased 6 percent from the depressed level of the previous year. Aggregate trade in all grains, however, remained 10 percent below the 1984-85 record. Improved trade was an important factor behind reduced stress on agricultural producers, farm supply and marketing firms, and agricultural lending institutions in the U.S. and several other major agricultural exporting nations. However, significant structural changes in these industries are continuing, and a severe 1988 drought will cause renewed deterioration in the financial position of some U.S. and Canadian producers and agribusiness firms. In the U.S., the net agricultural trade balance increased modestly but remained well below the level of the mid- to late 1970s and early 1980s. Major U.S. agricultural policy changes were continued during the 1987-88 trade year for the second consecutive season in an effort to maintain expanding U.S. farm product exports. These policies, along with foreign weather problems and depressed exchange rates of the U.S. dollar, have substantially increased the physical volume of the nation's agricultural exports, but low prices until mid-1988 held the value of exports sharply below the levels of the early 1980s. The shift in U.S. policies is continuing to have substantial impacts on agricultural producers, handlers, and costs of government price support operations, not only in the U.S. but in many other grain-producing nations as well.

Other developments in the world agricultural scene include: (1) continued high costs of government farm programs in the U.S., Western Europe, and other areas; (2) continued frictions over the expansion of the European Community (EC) to include Spain and Portugal, with resulting grain and oilseed trade restrictions by those two major grain importers; (3) a slight easing of the international debt problem of some oil-importing nations due to lower interest rates and moderate petroleum prices; (4) reduced purchasing power and a worsening of debt problems in some oil-exporting developing nations; (5) a slight rise in input costs in U.S. agricultural production, including those for fertilizer, some chemicals, land rental rates, and farm machinery; and (6) a sharp decline in the exchange rate of the U.S. dollar against West European and Japanese currencies. These developments appear likely to have a net positive impact on the competitive position of U.S. farm product exports in the next few years. However, a return to the sustained rapid export growth rates of the 1970s appears unlikely for the immediate future.

Food shortages in Africa worsened somewhat in 1987-88 and remained serious in several countries as well as in parts of Latin America and other developing nations. Despite adequate world supplies, there is a continuing long-term challenge in meeting the food needs of these nations.

The U.S., the EC, and Japan continued in a major trade policy confrontation in 1987-88, as a result of agricultural trade trends of the last several years and high costs of domestic agricultural income support programs. These conditions have led the U.S. to pressure Japan and the EC to further reduce their import restrictions on farm products.

World Grain Utilization, Trade Up Modestly

Table 1 shows the world supply and utilization of all grains in 1987-88 and comparisons with recent years. Preliminary data indicate aggregate world grain trade increased by 6 percent, or 11 million metric tons, from the previous season's depressed level, with global grain trade being the seventh highest level in the last 10 years. Increased trade reflected expanded imports by the Middle East and North Africa, China, the USSR, and some other Pacific Rim countries. However, growth in trade was only about two-thirds as large as the average annual percentage rate of the decade of the 1970s. Soviet imports are estimated to be about 17 percent above the previous year's reduced level because of a decline in 1987 wheat production, heavily subsidized U.S. and European grain exports, and increased utilization. Figure 1 compares the change in 1987-88 world grain exports with the pattern of the past two and one-half decades.

World grain utilization increased slightly in 1987-88, continuing a long-term upward trend that has been maintained for 13 years. Aggregate world utilization increased by an estimated 0.4 percent, thus reducing per capita world grain utilization by nearly 2 percent. Increases in grain utilization in 1987-88 are estimated to have occurred in the USSR, China, Japan, Canada, and the U.S. Grain utilization also increased slightly in a number of developing nations. Grain utilization is estimated to have declined slightly in Eastern Europe, Argentina, and Australia.

Table 1. Combined World Production, Utilization, Trade, and Carryover Stocks of All Grains in 1987-88, Projections for 1988-89, and Comparisons with Selected Recent Years in Millions of Metric Tons.

July-June Trade Years	Production	Utilization	Trade	Ending Stocks[a]	Stocks as % of Utilization
Projected					
1988-89	1,545	1,659	194	288	17.4
Preliminary					
1987-88	1,601	1,656	198	403	24.3
1986-87	1,680	1,649	187	460	27.9
1985-86	1,660	1,593	181	430	27.0
1984-85	1,645	1,585	219	362	22.8
1983-84	1,485	1,538	208	302	19.7
1982-83	1,548	1,500	201	355	23.6
1981-82	1,497	1,476	211	307	20.8
1980-81	1,447	1,475	216	286	19.4
1979-80	1,428	1,440	198	315	21.8
1976-77	1,363	1,303	158	281	21.5
1971-72	1,194	1,169	110	223	19.1
1966-67	1,004	973	104	189	19.4
1961-62	813	835	83	185	22.2

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; FG 8-88, August 1988; various other issues. Includes wheat, milled rice, and coarse grains.

[a] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

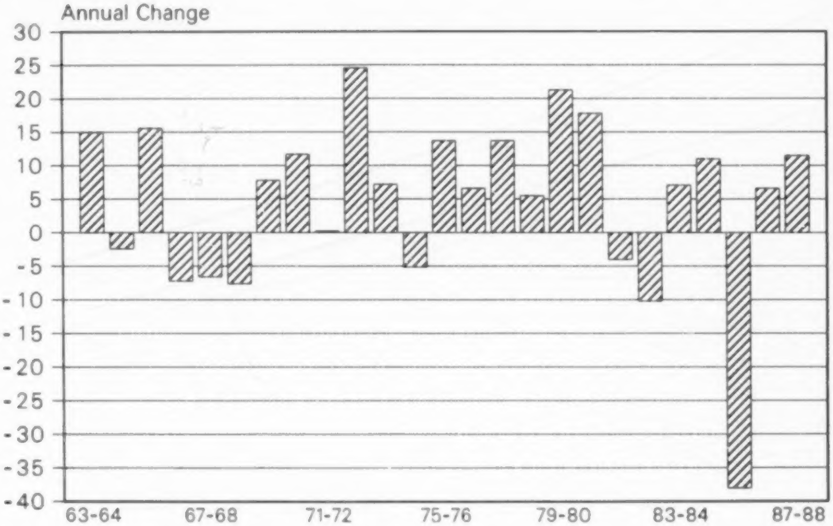
World grain production in 1987-88 dropped to an estimated 1,601 million metric tons, 5 percent below the previous season, but 17 percent above 11 years earlier. Production thus fell below the long-term upward trend of the previous two decades and lagged modestly behind world population growth. However, total production remained well above the recent low point in 1983-84 despite the smallest global area devoted to grain since that year's U.S. Payment-in-Kind (PIK) program. It was the second smallest world grain harvested area since 1974-75. Reduced plantings reflected aggressive U.S. land-idling programs and shifts to oilseed production in some areas. Grain production also declined in 1987-88 in parts of Western and Eastern Europe, Asia, and Argentina as a result of less favorable weather. Reduced production in these areas was only partially offset by larger grain crops in Canada and a few developing nations. World production in 1987-88 is estimated to have been 3 percent below utilization.

With production falling short of utilization, global grain carryover stocks declined in 1987-88 for the first time since 1983-84. Preliminary data place world grain stocks (excluding those in the USSR, China, and certain other centrally planned nations) at 24 percent of total annual utilization, moderately above the level that is generally considered adequate for world food security. This is the third highest percentage in more than two and one-half decades, and one-fourth above the percentage level of 1971-72.[1] As has been the usual pattern when world utilization exceeds production, a large part of the decrease in world grain stocks is occurring in the U.S., where grain stocks have been withdrawn from various government storage programs. Release of government storage stocks limited the upward movement of U.S. and world grain prices in 1987-88. Because of declining U.S. government stocks and a severe North American drought, substantially higher grain prices than a year earlier are expected in the 1988-89 trade year.

Short- and Intermediate-Term Prospects

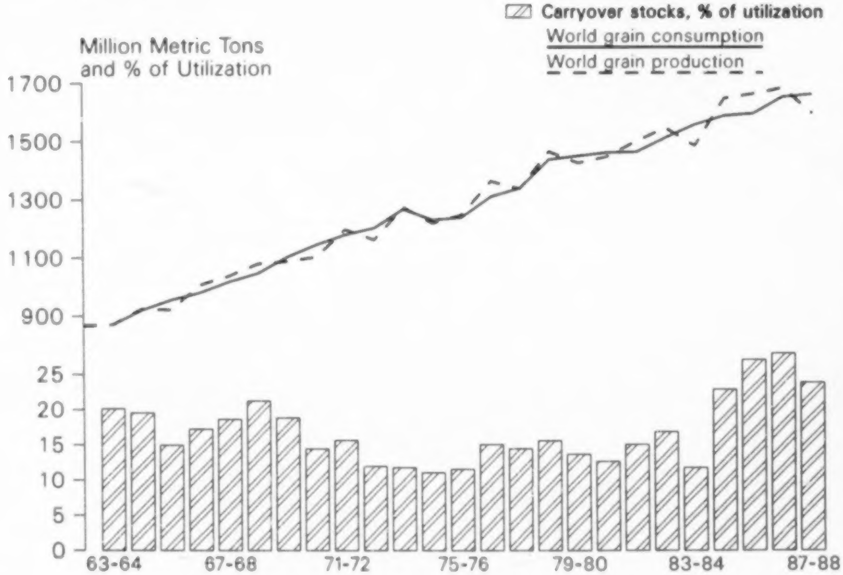
Because of adverse weather, U.S. grain production in 1988 will be well below 1987 despite slightly less aggressive U.S. government policies encouraging American farmers to remove land from production. Early reports indicate Soviet winter grain prospects are above last year's low levels. That nation has shown a strong tendency toward an alternating pattern of less favor-

Figure 1. Annual Change in Total World Grain Trade, 1963-64 through 1987-88 in Millions of Metric Tons.



Source: Compiled from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

Figure 2. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June 1963-64 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

able crops followed by favorable production the next year. In addition, early indicators point to some possible increase in Australia's grain harvest in 1988-89 due to increased plantings and better rainfall. Improved crops in these and other areas may moderate the decrease in global grain production in the year ahead. Barring widespread weather problems, improved crop management practices and wider geographic application of currently available production technology appear likely to maintain the long-term upward trend of global grain yields and production in the late 1980s and 1990s. The long-term trend in production, utilization, and stocks is shown in Figure 2.

World grain consumption appears likely to continue its long-term upward trend due to growth in world population and modest world economic growth. Longer-term trade patterns may be affected by a trend of several major importing nations toward increased grain production, thus reducing their grain import requirements. This trend may slow in the next few years, but still appears likely to hold growth rates in world grain trade well below those of the 1970s. Growth trends and stability of world grain trade also will be influenced by how successful recent USSR policy changes designed to stimulate lagging productivity in its grain sector turn out to be. Soviet imports have been large, highly variable from year to year, and are a major influence on the level of aggregate world grain trade.

World Wheat Production and Stocks Decline

World wheat production declined by an unusually large 4 percent in 1987-88, after increasing sharply in the previous year. The percentage decline was the largest in 10 years, and compares with declines of 6 percent in 1969-70 and 7 percent in 1963-64. World wheat production in 1987-88 fell moderately below global utilization, thus bringing a decline in global wheat stocks for the first time in seven years in both absolute size and as a percentage of annual world utilization (see Table 2). All of the estimated 2.5 percent increase in world wheat utilization reflected increased human consumption, with the amount of wheat fed to livestock and poultry remaining near the previous year's level. Wheat use for livestock and poultry feed is estimated to account for nearly one-fifth of total world utilization.

With increased food utilization, use of wheat in 1987-88 continued the long-term upward trend of the last three decades. Preliminary data indicate wheat utilization increased in the 1987-88 trade year in China, India, the EC, the USSR, and Eastern Europe, but declined in the U.S. and Canada. Global wheat utilization in 1987-88, estimated to be the highest on record, was up 40 percent from 11 years earlier.

World wheat carryover stocks, in absolute terms, still are well above the average of the 1970-82 period, despite a moderate decline in the trade year just ending. When related to annual utilization, however, the stocks are becoming a less burdensome influence on wheat prices than in the past four years. They represent approximately 28 percent of annual utilization, the smallest since 1981-82 and below the 30 to 40 percent level of the late 1960s. More than half of the decline in wheat stocks during the past year is estimated to have occurred in the U.S., with U.S. carryover stocks down 15.1 million metric tons and global stocks estimated to be down 28.8 million tons. Wheat carryover stocks are estimated to have increased during the year in the USSR and to have declined only slightly in the EC, Canada, and Argentina—three major non-U.S. exporters. Stocks also are estimated to have decreased in Eastern Europe, India, Australia, and China.

The sharply lower U.S. wheat stocks reflected an increased U.S. share of the world wheat trade in 1987-88. Wheat exports by the U.S. increased about 16 million metric tons, or 59 percent, during the year, while total non-U.S. exports decreased 3 million metric tons, or 5 percent (see Appendix V, Figure 1). Thus, the U.S. share of global wheat trade increased from 30 percent the previous year to 42 percent in 1987-88. The sharply increased U.S. trade share in 1987-88 reflected the recent major changes in U.S. agricultural policies, including sharply lower price support levels, increased direct government payments to farmers, and greatly expanded export enhancement or export subsidy programs.

Table 2. World Wheat Production, Utilization, Trade, and Carryover Stocks in 1987-88, Projections for 1988-89, and Comparisons with Selected Recent Years in Millions of Metric Tons.

July-June Trade Years	Production	Utilization	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks[a]	Stocks as % of Utilization
Projected							
1988-89	505.1	533.5	38.5	57.8	96.3	119.7	22.4
Preliminary							
1987-88	505.5	533.3	43.5	60.9	104.4	148.0	27.8
1986-87	529.1	520.4	27.3	64.0	91.3	176.8	34.0
1985-86	499.2	495.2	24.9	59.9	84.8	168.0	33.9
1984-85	511.5	492.6	38.8	68.2	107.0	164.1	33.3
1983-84	489.4	474.2	38.9	63.1	102.0	145.2	30.6
1982-83	477.3	460.1	41.1	57.6	98.7	130.0	28.3
1981-82	449.3	449.5	48.2	53.1	101.3	112.7	25.1
1980-81	443.0	450.8	41.2	52.9	94.1	112.9	25.0
1979-80	424.6	438.4	37.4	48.6	86.0	120.7	27.5
1976-77	421.4	380.9	25.9	37.4	63.3	127.5	33.5
1971-72	351.0	342.3	16.3	35.7	52.0	90.2	26.3
1966-67	306.7	279.8	20.3	35.7	56.0	86.3	30.9
1961-62	224.8	237.9	19.6	27.2	46.8	71.7	30.2

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 10-74, April 1974; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; FG 8-88, August 1988; various other issues. Includes wheat and wheat products.
[a]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

These policy changes, as the U.S. took steps to regain lost shares of global wheat trade, also contributed to the heightening tensions between the U.S. and the EC over trade policies and EC export subsidies. Results of the past two years indicate that changes in U.S. farm programs are having an impact on its competitive position in world wheat trade.

World Coarse Grain Production Down, Stocks Decline

Global coarse grain (feed grain) production decreased by an unusually large amount in 1987-88, with total 1987-88 output dropping 5 percent below the previous year but remaining 12 percent above the level of 11 years earlier (see Table 3). Much of the decrease in production reflected reduced plantings in the U.S., with U.S. coarse grain output down 37 million metric tons and world production down 45 million tons from 1986-87. Other countries and regions reporting reduced coarse grain production in 1987-88 included Eastern Europe, Canada, Argentina, Thailand, Australia, India, Pakistan, and South Africa. China and the USSR reported increased production. The EC's coarse grain production in 1987-88 was approximately the same as in the previous season. Coarse grain output fell short of world utilization by approximately 2.4 percent and produced the second largest one-year decline in global carryover stocks in the past two and one-half decades. The largest decline in global coarse grain carryover stocks was in 1983-84, when U.S. production fell sharply as a result of drought and an extremely aggressive government land-idling program. Global stocks that year declined by about 71 million metric tons, approximately three and one-half times the decline expected in the year just ending.

As has been the case in previous years of shortfalls in world production, much of the decline in stocks occurred in the U.S.[2] U.S. coarse grain carryover stocks are projected to decrease by 9 percent by fall 1988, dropping approximately 14 million metric tons below a year earlier. Non-U.S. stocks are projected to decrease by only about 6 million metric tons. With the U.S. coarse grain sector still performing most of the burden of adjusting available supplies to meet market demand, the U.S. administration has used newly acquired policy tools to force part of its excess government stocks into world markets. These U.S. tools will be discussed in a section later in this report that reviews the 1985 Food Security Act passed by the U.S. Congress in December 1985.

World coarse grain consumption remained almost constant in 1987-88, thus lagging behind the annual world population growth rate. Increased coarse grain utilization is reported to have occurred in the U.S., the USSR, China, Canada, and several developing nations. Increased utilization in these areas is offsetting decreased utilization in parts of Western and Eastern Europe. World coarse grain utilization reflected a slight expansion in global livestock and poultry output, and a substitution of grain for forage in some areas because of severely depressed coarse grain prices. Although U.S. prices for maize (corn) were higher than in the previous trade year, prices during much of 1987-88 were still at the second lowest levels of the last 15 years.

In the trade picture, U.S. exports increased moderately for the second consecutive year, after an earlier six-year downtrend. The U.S. trade share in coarse grains increased in 1987-88 to 63 percent of world exports, with U.S. exports expected to increase by approximately 6 million metric tons at the same time that aggregate non-U.S. exports decrease by an estimated 7 million tons (see Appendix V, Figure 2).

A significant factor in the increased U.S. coarse grain exports in 1987-88 was the sharp decline in U.S. coarse grain price support levels implemented in the fall of 1986 and continuing in 1987 and 1988 as the U.S. Food Security Act of 1985 went into effect. The effective U.S. price support loan

Table 3. World Coarse Grain Production, Utilization, Trade, and Carryover Stocks in 1987-88, Projections for 1988-89, and Comparisons with Selected Recent Years in Millions of Metric Tons.

July-June Trade Years	Production	Utilization	U.S. Exports[a]	Non-U.S. Exports	Total Trade[b]	Ending Stocks[c]	Stocks as % of Utilization
Projected							
1988-89	717.9	803.1	49.0	35.9	84.9	127.9	15.9
Preliminary							
1987-88	788.0	807.5	52.3	30.4	82.7	213.2	26.4
1986-87	832.9	806.7	46.3	37.3	83.6	234.0	29.0
1985-86	842.0	777.3	36.6	46.6	83.2	207.8	26.7
1984-85	814.5	781.8	56.6	43.8	100.4	143.1	18.3
1983-84	687.2	758.3	56.6	36.7	93.3	110.4	14.6
1982-83	784.0	753.4	53.0	37.0	90.0	181.4	24.1
1981-82	766.4	741.3	60.0	37.8	97.8	150.8	20.3
1980-81	731.9	747.6	70.7	37.6	108.3	125.8	16.8
1979-80	744.4	741.9	71.0	28.5	99.5	141.5	19.1
1976-77	704.4	684.3	50.1	33.8	83.9	115.5	16.9
1971-72	626.3	609.7	24.2	25.1	49.3	104.4	17.1
1966-67	517.8	514.8	20.0	20.0	40.0	84.1	16.3
1961-62	440.5	447.5	15.9	14.1	30.0	105.2	23.5

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 10-74, April 1974; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988, FG 8-88, August 1988, various other issues.

[a] Based on market years.

[b] From 1976-77 on, the trade year is October-September.

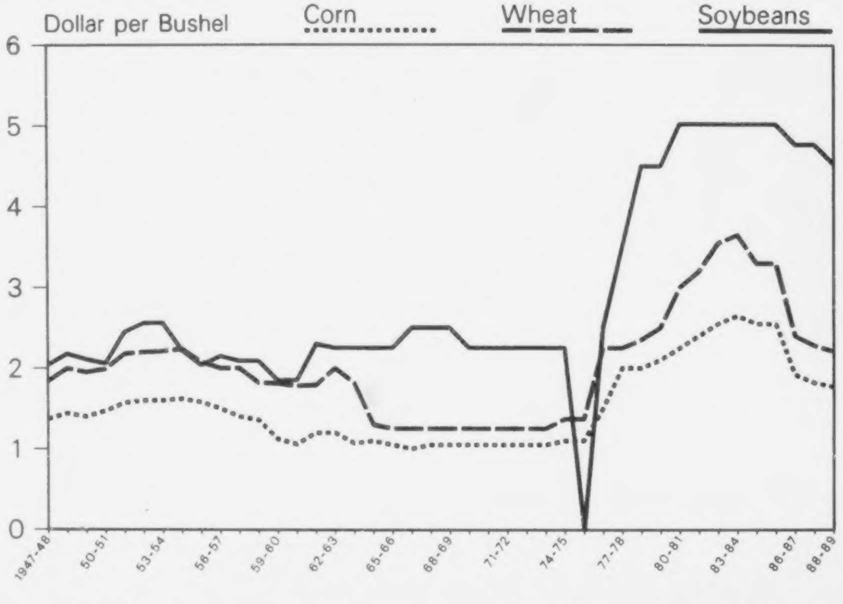
[c] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

rate for 1987-crop corn (the most important U.S. coarse grain) was lowered $.73 per bushel ($28.76 per metric ton) from the support rate for the 1985 crop. Support levels for other U.S. coarse grains were reduced similarly, and other policy tools pushed U.S. prices sharply below even the new lower government support levels (see Figure 3) until interrupted in 1988 by a severe U.S. drought. Since U.S. prices are a major influence on world price levels, the U.S. support level reduction signaled competing exporters to slow or halt expansion of their production, and may lead to additional gains in the U.S. share of global coarse grain trade in future years. Low prices should be expected in later years as U.S. crop production recovers from the drought. That should also encourage slightly accelerated long-term growth of global coarse grain utilization by making livestock and poultry products slightly more affordable to world consumers.

World Rice Production, Stocks Down Sharply

Global production of rice declined by an unusually large 3 percent in 1987-88, the third decline in 12 years. Despite the decline, production was still the fifth largest on record, 7.3 percent above five years earlier, but slightly below aggregate world consumption (see Table 4). As a result, world rice stocks are expected to decline sharply both in absolute size and as a percent of annual utilization by the end of

Figure 3. U.S. Corn, Wheat, and Soybean Price Support Loan Rates, 1947-48 through 1988-89.



Source: U.S. Department of Agriculture, Economics and Statistics Service, *Grain and Feed Statistics through 1961*, Statistical Bulletin No. 159 (Washington, D.C.), revised June 1962. USDA-EES, *Feed Situation*, FDS 228, April 1969; FDS 231, November 1969; FDS 241, November 1971; FDS 246, November 1972; FDS 260, February 1976; FDS 264, February 1977; FDS 268, February 1978; FDS 272, February 1979. USDA, Economic Research Service, *Feed Outlook and Situation*, FDS 282, August 1981; FDS 286, August 1982; FDS 292, March 1984; FDS 295, November 1984; FDS 299, March 1986. USDA-ERS, *Wheat Outlook and Situation Yearbook*, WS 277, February 1987. USDA, Agricultural Marketing Service, *Background for 1985 Farm Legislation*, Agricultural Information Bulletin No. 472, 1985.

Table 4. World Milled Rice Production, Utilization, Trade, and Carryover Stocks in 1987-88, Projections for 1988-89, and Comparisons with Selected Recent Years in Millions of Metric Tons.

July-June Trade Years	Production	Utilization	U.S. Exports[a]	Non-U.S. Exports[a]	Total Trade[a]	Ending Stocks[b]	Stocks as % of Utilization
Projected							
1988-89	322.0	322.9	2.6	9.6	12.2	40.9	12.7
Preliminary							
1987-88	307.5	315.7	2.4	8.2	10.6	41.7	13.2
1986-87	317.7	322.3	2.7	9.8	12.5	49.2	15.3
1985-86	319.0	320.0	1.9	10.9	12.8	53.8	16.8
1984-85	318.9	310.8	2.0	9.5	11.5	54.8	17.6
1983-84	308.6	305.1	2.3	10.3	12.6	46.7	15.3
1982-83	286.5	286.5	2.2	9.7	11.9	43.2	15.1
1981-82	281.6	285.4	2.7	9.1	11.8	43.3	15.2
1980-81	271.6	276.8	3.0	10.1	13.1	47.2	17.0
1979-80	258.7	260.2	2.7	10.0	12.7	52.4	20.2
1976-77	237.0	238.1	2.1	8.5	10.6	37.8	15.9
1971-72	216.4	216.8	1.8	6.9	8.7	28.4	13.1
1966-67	179.3	178.7	1.7	6.1	7.8	18.6	10.4
1961-62	147.3	149.2	0.9	5.4	6.3	8.5	5.7

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; FG 8-88, August 1988; various other issues.

[a] Exports are computed on an August-July year basis.

[b] Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

the 1987-88 trade year. Reduced production reflected sharply smaller crops in India and Thailand, and slightly reduced production in Japan, Indonesia, Pakistan, the U.S., and Bangladesh. Production increased in China.

World rice consumption declined slightly in 1987-88 after trending upward every year except two in the previous two and one-half decades. Much of the decrease in utilization in 1987-88 is believed to have occurred in India, the world's second largest rice-consuming nation.

Reported global rice stocks are projected at 42 million metric tons, 15 percent below last year. Stocks at this level are equivalent to 13.2 percent of annual utilization, about the same as the levels of the early 1970s. However, it should be noted that reported stocks exclude those of North Korea, Laos, Vietnam, and China, where official stocks data are not published. These four nations produce approximately 60 percent of the world's rice output. Exclusion of their stocks almost certainly understates world stocks by a substantial margin. Ending U.S. rice stocks in 1987-88 are projected to decline by 35 percent, a much sharper decline than at the world level. The U.S. accounts for less that 2 percent of world rice production, but is one of the world's largest rice exporters.

World rice exports are projected to decrease by about 15 percent in the 1987-88 trade year. As with other grains, the U.S. share of global rice exports is increasing slightly after several years of a steep downtrend. U.S. rice exports are expected to drop 11 percent below the 1986-87 level while non-U.S. exports are projected to decrease by about 16 percent.

The U.S. in 1988 overtook Thailand as the world's largest rice exporter. Other leading rice exporters include the EC, China, and Burma.[3] Rice exports from Thailand and Pakistan in 1988 are expected to be well below last year due to a drought-reduced 1987 harvest. U.S. rice exports are expected to be down 20 percent from the peak level of seven years earlier. Total non-U.S. exports are expected to be 19 percent below 1980-81.

Among major importers, increased imports in 1988 are expected for India, Sri Lanka, and the Philippines, with most other importers reducing their imports.

For the longer term, world rice production and consumption appear likely to continue their nearly steady long-term upward trend. Increased consumption will be generated by relatively rapid population growth rates in many major rice-consuming nations. Technological developments and increased application of currently available technology appear likely to maintain the upward trend of global production for the next several years, in the absence of widespread adverse weather in key rice-growing areas. Prospects for growth in world trade in rice are less certain and may be restrained some by increased production in importing nations.

World Oilseed Production, Exports, Utilization Up Modestly, Stocks Down

Preliminary estimates indicate aggregate world production of eight major oilseeds rose to a record 205 million metric tons in 1987-88. That reflects an increase of 6 percent from a year earlier and a 24 percent increase from four years earlier. Production of soybeans, cottonseed, sunflowerseed, and rapeseed increased significantly from the previous year as a result of favorable weather and increased area planted in several major producing regions. The increase in soybean production was concentrated largely in the EC, Brazil, and Argentina, where increases of 67, 2, and 41 percent, respectively, more than offset an estimated 2 percent decline from the previous year in U.S. production. The slight decline in U.S. production was due to reduced plantings, while increased Brazilian and Argentina production reflected increased area planted and more favorable Argentine weather than in the previous year. The increase in EC production was due largely to increased plantings in southern Europe. The world cottonseed crop increased by approximately 13 percent in 1987-88, after two consecutive years of declining production. The larger cottonseed crop was due mainly to increased area harvested in China, the U.S., and Brazil, which more than offset reduced production in India and the USSR. The world's leading cotton and cottonseed producers, in order of size, continue to be China, the U.S., the USSR, India, Pakistan, and Brazil.

Sunflowerseed production increased by an estimated 5 percent from the previous year as a result of increased production in Argentina, the USSR, and Eastern and Western Europe. Increases in these countries slightly more than offset a decline in production in China. Rapeseed production expanded substantially in China, Canada, and the EC as a result of favorable weather and increased area planted. The EC rapeseed crop increased by 63 percent, continuing the long-term upward trend of recent years. Copra production decreased slightly in response to less favorable weather than the previous year in the Philippines, which is a major producer of this product. Palm kernel production, however, increased by an estimated 8 percent as a result of favorable weather in Malaysia.

Global exports of major oilseeds, according to preliminary projections by the U.S. Department of Agriculture, continued the long-term upward trend in 1987-88 after being interrupted by a three-year downtrend that ended in 1984-85.[4] Preliminary data in Table 5 indicate aggregate exports will be 4 percent higher than in 1986-87 as a result of increased Soviet imports, slightly improved meal demand in Europe and the Far East, and prices in West European markets that are more competitive with other feed ingredients as a result of the sharp decline in the exchange rate of the U.S. dollar.

World utilization of major oilseeds continued its long-term upward trend in 1987-88, with preliminary estimates showing an increase of 3.6 percent from the previous marketing year. Global oilseed utilization has increased each of the past four years at a rate moderately exceeding world population growth. Expanded utilization in excess of the population growth rate reflects growing consumer incomes in rapidly and moderately developing nations, and a resulting growth in demand for livestock and poultry products. Preliminary estimates indicate global oilseed utilization in the marketing year just ending was 22 percent above four years earlier. Growth at that rate reflects an increase in world per capita utilization of approximately 12 percent since 1983-84. Of the major oilseeds, soybeans and rapeseed have shown the strongest increases in utilization in the last four years. Utilization of other oilseeds has been more variable from year to year, due partly to fluctuations in supplies resulting from weather variability in major producing areas. In the years ahead, world oilseed utilization is likely to continue its long-term upward trend in response to growing consumer incomes and efforts by centrally planned nations such as the USSR and China to increase the efficiency of their livestock sectors.

Global carryover stocks of major oilseeds at the end of the 1987-88 trade year are projected to be about 11 percent smaller than a year earlier. Stocks at that level would represent about 13 percent of total annual utilization. Most of the projected decrease in oilseed stocks is in soybeans, with reductions in stocks of that commodity concentrated primarily in the U.S. Increases in carryover stocks of cottonseed, sunflowerseed, and rapeseed are expected. Unlike grains, U.S. soybean exports in 1987-88 are expected to be modestly above the previous year's level, while aggregate non-U.S. exports are increasing substantially, due largely to a sharp increase in Brazil's and Argentina's March-May 1988 soybean harvest.

Global production of major protein meals and vegetable oils in 1987-88 increased modestly from a year earlier, with increases of about 3.5 percent for protein meals and 2.6 percent for vegetable oils (see Table 6). Increases in oil production reflect increased output of palm, sunflowerseed, rapeseed, cottonseed, olive, fish, and palm kernel oil. Most of these products are from oilseeds high in oil content. In contrast, soybeans have a relatively low oil content and higher meal yield per ton.[illegible] Increased oil production, slow growth in world demand, and competition from large butter stocks have held U.S. and world soybean oil stocks at relatively high levels and have kept soybean oil and other vegetable oil prices (in current U.S. dollars) at low levels relative to those for protein meal. Global stocks of most other vegetable oils and total fats and oil stocks also are expected to be at relatively high levels, but in some cases are expected to be slightly below a year earlier at the end of the 1987-88 trade year.

Ending world protein meal stocks in 1987-88 are expected to be modestly below levels of a year earlier. Declining stocks have caused processors to crush oilseeds more for meal than for oil, with meal providing a larger share of the value of oilseeds than last season. With a relatively tighter supply situation in meal than in oil, 1987-88 meal prices were moderately above the previous year until mid-1988 but generally below levels of the mid- to late 1970s. Meal demand continues to be slightly restrained by extensive wheat feeding in many foreign areas. For that reason, the growth in global utilization of protein meal in 1987-88 was considerably less than in some previous years. Wheat has a higher protein content than corn, thus reducing the need for supplemental protein meal when it is used to replace corn in livestock and poultry rations. Early indications point to a substantial tightening of world protein meal and vegetable oil supplies in the year ahead, due to the severe U.S. and Canadian drought. Meal and oil supplies after April 1989 will depend heavily on new-crop soybean production in Brazil and Argentina. Favorable weather in these two countries could lead to some easing of tightness in meal supplies from late April 1989 onward.

As Figure 4 indicates, much of the long-term growth in world protein meal production has come from soybean meal. That pattern appears likely to continue over the next several years, with an upward trend in soybean production in South America over the longer term, and probably an increase in the U.S. in 1988-89. However, with large world wheat supplies and potentially higher yields through expanded use of hybrid varieties, wheat feeding may remain relatively high in the next few years. That, along with slower growth in the world economy and continued global debt problems, may hold the growth in the world demand for soybean meal to a more modest rate than in the 1970s.

Figure 5 indicates that soybean oil has faced much greater competition from other products in world markets than has been the case with soybean meal. Soybean oil

Table 5. World Oilseed Production, Crush, Trade, and Carryover Stocks in 1987-88 and Selected Recent Years in Millions of Metric Tons.

July-June Trade Years	Production	Crush	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks	Stocks as % of Crush
Preliminary							
1987-88	205.02	165.91	22.32	16.80	39.12	21.10	12.72
1986-87	194.20	160.18	21.27	16.22	37.49	23.66	14.77
1985-86	195.88	154.46	21.01	13.35	34.36	26.60	17.22
1984-85	191.01	150.44	17.72	15.28	33.00	21.10	14.03
1983-84	165.00	135.76	21.64	11.34	32.98	15.72	11.58
1981-82	169.35	138.33	27.14	14.27	35.84	18.89	13.66
1980-81	155.52	132.61	21.57	10.56	32.13	20.48	15.44
1979-80	170.15	133.77	26.21	9.80	36.01	19.33	14.45

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 6-88, June 1988; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-85, April 1985, and FOP 5-84, May 1984.

Table 6. World, U.S., and Foreign Production of Oilseed Products in 1972-73, 1979-80, 1985-86, 1986-87, and 1987-88 in Millions of Metric Tons.

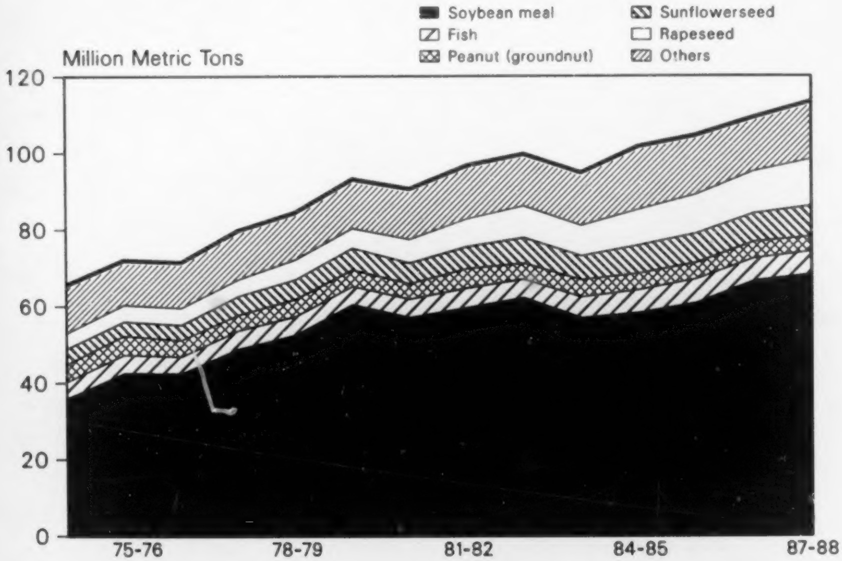
	44% Protein Meal Equivalent					% Change	Fat and Oil Production[a]					% Change
	1972-73	1979-80	1985-86	1986-87	1987-88	1972-87	1972-73	1979-80	1985-86	1986-87	1987-88	1972-87
U.S.	17.8	27.3	25.0	26.0	26.6	+49.4	7.8	10.4	10.0	10.3	10.4	+33.3
Non-U.S.	35.6	58.8	75.2	78.8	81.9	+130.0	30.6	41.6	50.6	50.7	52.2	+70.6
World Total	53.4	86.1	100.2	104.8	108.5	+103.2	38.4	52.0	60.6	61.0	62.6	+63.0

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 25-77, December 1977; and personal communication with officials of U.S. Department of Agriculture.

[a] Excluding linseed oil.

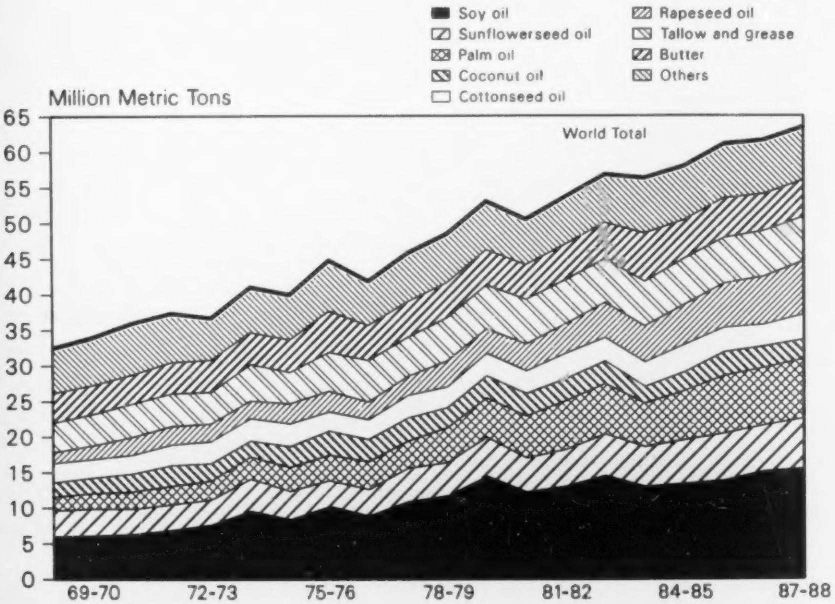
production continues to be larger than that of any other individual vegetable, marine, or animal fat or oil. But combined production of all other fats and oils is nearly four times as large as soybean oil. In the years immediately ahead, soybean meal will likely remain the dominant source of protein meal for livestock and poultry feeding. However, recently expanded palm tree plantings in Malaysia, and interest in similar plantings in other tropical nations, suggest that a significant part of the growth in world demand for vegetable oils will be supplied by palm oil during the next 5 to 10 years.[6]

Figure 4. World Protein Meal Production by Type of Product, 1974-75 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues; and personal communications with officials of U.S. Department of Agriculture.

Figure 5. World Fat and Oil Production by Type of Product, 1968-69 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

Long-Term Trend in World Grain Area and Yields

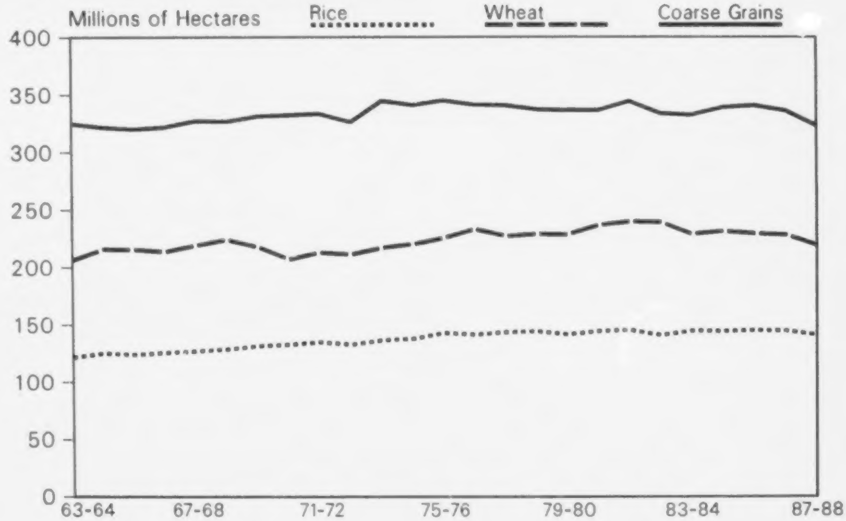
World harvested grain area in the 1980s has deviated somewhat from earlier years, with the area devoted to grain declining after several decades of expansion to a peak in 1981-82. Along with a slight downward trend since the peak year, global grain area has exhibited sizable year-to-year fluctuations, the largest of which occurred in 1987-88. Total world grain area harvested in 1987-88 was 6.4 percent, or 47.2 million hectares, below the 1981-82 record, with reductions in the area devoted to each of the three major categories of grain: wheat, rice, and coarse grains. Forty percent of the decline in global harvested grain area since 1981-82 can be accounted for by U.S. land-idling programs. The U.S. harvested area of grain declined by 8.1 million hectares in 1987-88 and 5.6 million hectares in 1986-87 as government program incentives for idling cropland were increased sharply. Foreign farmers also devoted 15 million fewer hectares to grain production in 1987-88 than a year earlier, with world harvested area devoted to grain dropping 23.1 million hectares below 1986-87. Preliminary data indicate an additional decline of about 3.3 million hectares has occurred in U.S. grain area in 1988-89 with continued large government program incentives to idle land and drought-restricted plantings.

Global grain area harvested may expand some in the next two years with partial relaxation of U.S. government land-idling programs,[7] along with longer-term factors at work in several other countries. Factors behind the earlier decade's-long expansion of world harvested grain area included more extensive cropping practices, shifts from pasture to grain production, drainage of wet areas, land clearing in parts of the U.S. and South America, and increased use of irrigation to convert arid or semi-arid areas to crop production. Year-to-year changes in the world's cropland base resulting from such adjustments have been small. But over a three-decade time span, the impact was sizable and contributed to the long-term upward trend in global food production. The long-term trend, however, was interrupted in the 1982-88 period, as a result of U.S. farm programs, depressed world prices, and weather problems in some areas.

Wheat, Coarse Grain Area Decline

Figure 6 and Table 7 indicate world coarse grain area harvested and area harvested in several major producing countries declined

Figure 6. World Harvested Area Devoted to Individual Grains in Millions of Hectares, 1963-64 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

Table 7. Coarse Grain and Wheat Area Harvested in Millions of Hectares in Selected Major Producing Countries, 1987-88 and Comparisons with Recent Years.[a]

	Coarse Grains							Wheat						
Area or Country	1970-71	1981-82	1983-84	1984-85	1985-86	1986-87	Prelim. 1987-88	1970-71	1981-82	1983-84	1984-85	1985-86	1986-87	Prelim. 1987-88
W. Europe	24.0	24.4	23.3	23.4	23.8	23.1	22.4	17.0	16.4	17.0	17.1	16.2	16.6	16.8
Canada	8.4	9.2	7.8	8.0	8.3	7.8	8.0	5.1	12.4	13.7	13.2	13.7	14.2	13.5
Australia	4.3	4.8	5.8	5.5	5.2	4.4	4.7	6.5[a]	11.9[a]	12.9	12.1	11.7	11.3	9.0
Argentina	7.5	6.4	6.2	6.1	5.6	4.7	4.7	3.7	5.9	6.9	6.0	5.3	5.1	4.9
S. Africa	5.5	5.3	4.8	4.8	4.9	4.9	4.8	1.9[a]	1.8	1.8	1.9	2.0	1.9	1.9
USSR	43.9	58.0	61.2	59.2	58.5	58.6	59.8	65.2	59.2	50.8	51.1	50.3	48.7	46.0
Total above	93.6	108.1	109.1	107.0	106.3	103.5	104.4	99.4	107.6	103.1	101.4	99.2	97.8	92.1
U.S.	39.7	43.6	32.9	43.6	45.5	41.5	35.4	17.7	32.8	24.8	27.1	26.2	24.6	22.6
Total above	133.3	151.7	142.0	150 6	151.8	145.0	139.8	117.1	140.4	127.9	128.5	125.4	122.4	114.7

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 10-74, April 1974; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; and *Foreign Agriculture Circular, World Crop Production*, WCP 4-85, April 11, 1985; WCP 4-86, April 1986; WCP 12-87, December 1987; and personal communications with officials of U.S. Department of Agriculture, Foreign Agricultural Service.

[a] Planted area.

slightly in 1987-88 for the second year in a row, with reductions in the U.S., Argentina, South Africa, and Thailand. Global area harvested was 3.9 percent below a year earlier and 7.7 percent below the global record reached in 1981-82, but was unchanged from two decades earlier. World wheat area harvested in 1987-88 dropped 3.9 percent below a year earlier and was 8 percent below the 1981-82 record (see Figure 6). From a longer-term perspective, global wheat area was down 3.5 percent from one decade earlier but equal to the harvested area of two decades ago. Wheat area in the U.S. declined by 8 percent in 1987-88 in response to government program incentives, along with decreases in the USSR, Canada, Argentina, and Australia, and slight expansions in the EC and Eastern Europe. U.S. wheat area harvested in 1987-88 was still 28 percent larger than 17 years earlier, when a large amount of U.S. cropland was idled under government programs and the export boom of the 1970s had not yet emerged. Last season's harvested area of all non-U.S. wheat producers was 14.8 percent below the 1970-71 level, with most of the decrease due to an estimated 19 million hectare decline in Soviet wheat area. Non-U.S. wheat producing nations that sharply expanded harvested area in the 1970s and early 1980s included Canada, Argentina, and Australia.

Rice Area Breaks Long-Term Upward Trend

As with other grains, world rice area harvested reached a peak in 1981-82 after a decade's-long upward trend, and has been somewhat variable since that time. World rice area harvested decreased slightly in 1987-88 for the second consecutive year and for the third time since 1981-82 (see Figure 6). Preliminary estimates place global area 2.6 percent less than the record 1981-82 and similar 1985-86 level, but 11 percent larger than two decades earlier. U.S. rice area harvested in 1987-88 was sharply below its 1981-82 record level, as a result of changes in farm programs. However, the reduction in U.S. rice area accounts for only 15 percent of the estimated decline in global rice area since 1981-82. U.S. rice harvested area expanded modestly in 1988-89 because of increased prices and reduced government incentives to idle land.

Changes in U.S. Farm Programs Help Balance World Supply and Demand

In 1987-88, as in several other past years, the U.S. continued aggressive land-idling programs as part of an effort to help balance world production and utilization. But unlike many previous years, the U.S. also used lower support prices and large export subsidies to help accomplish that objective. These policy changes and resulting low world prices signaled to foreign producers that grain plantings should be reduced. The year 1983-84 is an excellent example of weaknesses from a U.S. unilateral attempt to balance world production and utilization solely by removing U.S. land from production. That year also provides contrasts between the global impact of current and earlier U.S. farm programs. The U.S. Payment-in-Kind program in 1983-84 reduced U.S. wheat area harvested by 23 percent as farmers received government grain in return for reducing their plantings and were allowed to graze or harvest previously planted wheat as hay. At the same time, three regions—Canada, Australia, and Western Europe—expanded their wheat area to take advantage of an expected strong increase in world prices stemming from U.S. actions. Their production response partially offset supply-control efforts of the U.S. After holding their plantings near the 1983-84 level for the next three years despite further reductions in U.S. wheat area, some of these countries finally reduced their wheat area in 1987-88. Reduced plantings in these exporting nations were partly in response to depressed world wheat prices resulting from lower U.S. price support levels and large U.S. wheat export subsidies that helped to keep world prices below U.S. levels. Net effects from these changes in U.S. agricultural policies included low world wheat prices, high farm program costs to U.S. taxpayers, and a reduction in 1987-88 U.S. and foreign wheat area. Last season's U.S. and world harvested wheat areas were the lowest in 14 years and have permitted U.S. and world wheat carryover stocks to drop substantially below a year earlier.

Longer-Term Prospects

World grain area harvested may trend upward in the early to mid-1990s, with a continuation of long-term trends toward more intensive land utilization and reduced U.S. land-idling programs. For the longer term, the greatest potential for expanded plantings appears to be in South America. Land-clearing operations in Brazil will likely continue in future years and additional Argentine pastureland eventually could be converted to grain production. With favorable economic conditions, some additional land also could be cleared and drained for crop production in the U.S. However, such land is unlikely to be brought into crop production in significant quantities unless profit margins in crop production increase sharply from current levels, and until land in the 10-year U.S. Conservation Reserve land-idling program is released for production in the mid- to late 1990s. The Soviet Union also has some additional land that could be brought into crop production through irrigation or drainage. Whether or not such land is utilized will depend on the priority placed on agriculture by the Soviet administration, and the cost and availability of imported grain.

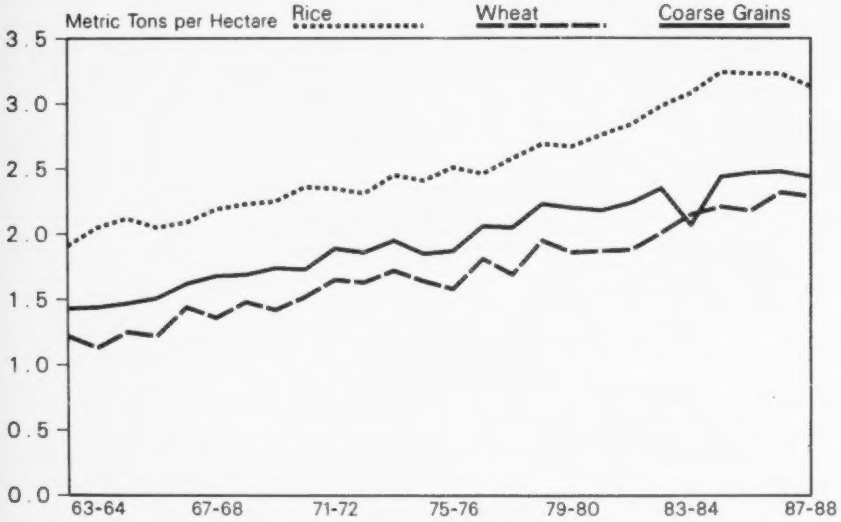
Trends in Global Grain Yields

Over the past 25 years, as shown in Figure 7, world grain yields per hectare have shown an irregular long-term upward trend. During this period, global rice yields increased approximately 88 percent, along with a 64 percent increase for wheat and a 71 percent increase for coarse grains. The global average coarse grain yield has remained relatively stable since 1984-85, due to weather problems in parts of the Southern Hemisphere, Eastern Europe, and Southern Asia.

Wheat and rice yields increased at a slightly accelerated rate in recent years until 1987-88, due to the spread of higher-yielding hybrid varieties, increased use of fertilizer, expanded use of irrigation in some areas, and other technological innovations. Rice yields in 1987 were reduced by widespread drought in India, Thailand, and neighboring countries. With favorable weather, a resumption of the upward trend in global average grain yields appears likely during the next several years. The upward trend likely will be due to increased applications of existing yield-improving technology, as well as by an ongoing development of improved varieties, better management, improved cultural practices, and other technological developments.

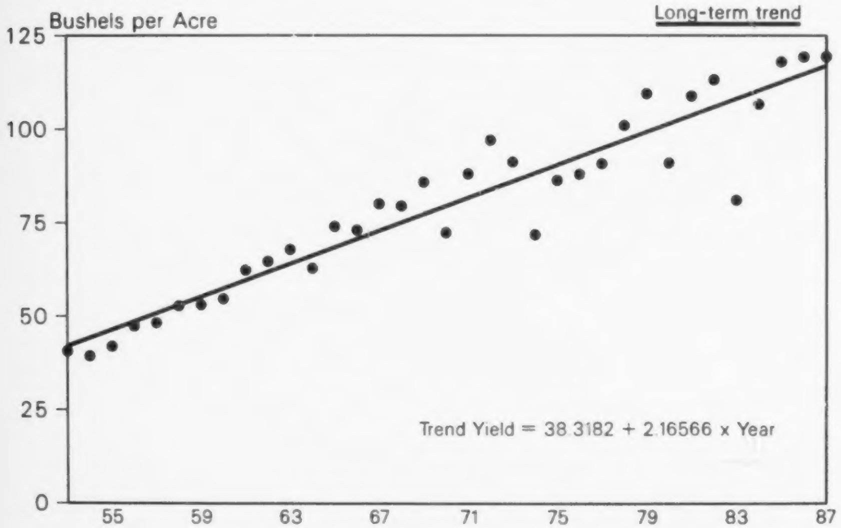
Figure 8 shows the long-term upward trend in U.S. corn (maize) yields from the early 1950s through 1987. During this period, yields have increased at an average rate of slightly over 2 bushels per acre (0.13 metric tons per hectare) per year, and the upward trend has continued into the late 1980s.[8] Figure 8, however, does show an increased year-to-year variability of U.S. corn yields in the 1970s and 1980s when compared with the previous two decades. Greater variability of yields in recent years is believed to be due to increased year-to-year fluctuations in temperatures and rainfall in the U.S. cornbelt, rather than to characteristics of current corn production technology.

Figure 7. World Grain Yields in Metric Tons per Hectare, 1962-63 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

Figure 8. U.S. Corn Yields in Bushels per Acre, 1953-87.



Source: U.S. Department of Agriculture, Statistical Reporting Service, Crop Reporting Board, *Crop Production 1987 Summary*, crpr 2-1 (88), January 1988; *Field Crops*, Statistical Bulletin No. 708, and various other issues.

Table 8. Comparative Yields in Metric Tons per Hectare of Selected Grain Producing Countries.

	Coarse Grains						Wheat					
Area	1979-80	1981-82	1983-84	1985-86	1986-87	Prelim. 1987-88	1979-80	1981-82	1983-84	1985-86	1986-87	Prelim. 1987-88
U.S.	5.70	5.71	4.20	6.04	6.10	6.10	2.30	2.32	2.65	2.52	2.32	2.53
Canada	2.63	2.83	2.68	3.02	3.26	3.24	1.64	2.00	1.94	1.77	2.20	1.95
Argentina	2.20	2.88	2.82	3.12	2.80	2.94	1.69	1.41	1.85	1.61	1.76	2.04
Brazil	1.73	1.71	1.65	1.67	1.95	1.89	0.75	1.15	1.11	1.54	1.44	1.76
Australia	1.47	1.37	1.63	1.51	1.51	1.47	1.45	1.38	1.70	1.38	1.44	1.33
World	2.17	2.20	2.05	2.47	2.48	2.44	1.85	1.87	2.14	2.18	2.32	2.29

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 4-82, April 12, 1982; WCP 3-84, March 9, 1984; WCP 4-85, April 11, 1985; WCP 4-86, April 1986; WCP 7-87, July 1987; *Foreign Agriculture Circular, World Agricultural Production*, WAP 1-88, January 1988; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

Trends in Global Oilseed and Soybean Area and Yields

Global oilseed area harvested increased in 1987-88, after slight declines in the previous two years. With strong oilseed prices, another increase in area harvested is anticipated in 1988-89. The earlier decline reflected reduced soybean area planted in the U.S., as well as reduced cottonseed plantings in the U.S., India, and China, and reduced sunflowerseed plantings in the U.S., Argentina, and the USSR. The 6.0 million hectare decline in U.S. soybean plantings from 1982 to 1987 reflects more attractive returns from production of alternative crops and idling of cropland in various government programs. With better weather and increased soybean plantings, South American soybean area increased substantially in 1987-88 (see Table 9). Total world soybean area harvested in 1987-88 rose 3.6 percent above the previous year and was about one-fourth larger than a decade earlier. Aggregate world area harvested and the average yield per hectare of all oilseeds are shown in Figure 9, with area devoted to individual crops shown in Figure 10 and yields of individual crops in Figure 11. Harvested area and yields both have exhibited a long-term upward trend but with a tendency toward downward deviations of one to two years.

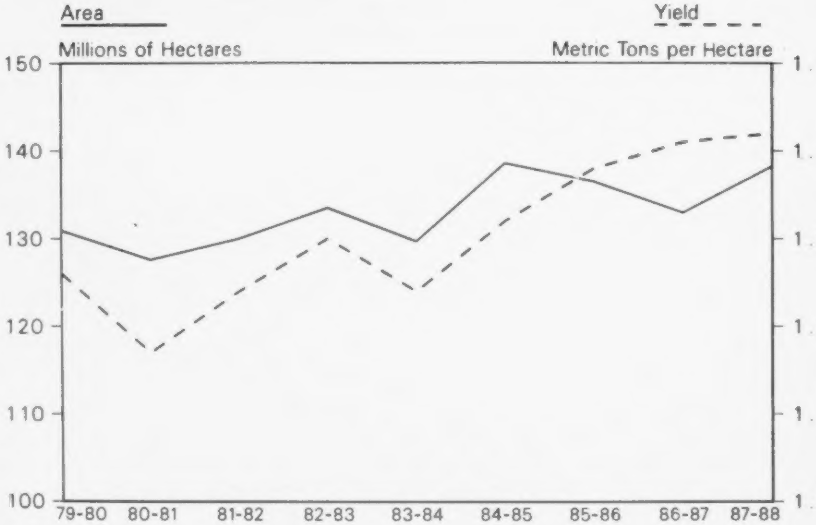
The long-term upward trend in global oilseed area reflects land clearing in Brazil, conversion of pastureland to soybeans in Argentina, shifts from small grains and pasture to soybeans in the U.S., and increased rapeseed plantings in Canada, the EC, China, and India. These trends appear likely to continue in most areas in the next few years as a result of relatively high oilseed/grain price ratios and policy actions by the EC and India to encourage increased self-sufficiency in oilseed production. Growth of U.S. soybean plantings will be restrained somewhat by the long-term government land conservation reserve program designed to idle highly erodible farmland for up to 10 years.

Average world oilseed yields have been in a gradual long-term upward trend for the past several years, as shown in Figures 9 and 11 and Table 10. That trend appears likely to continue in the years ahead but will be interrupted periodically by unfavorable weather in major growing regions. The upward trend reflects higher yielding varieties, improved production management, the gradual dispersion of currently available technology for weed and disease control, and improved harvesting practices to reduce field losses and quality deterioration.

Future Trends in World Soybean Production

Trends in world soybean plantings in the next few years will be influenced considerably by the extent of growth in world

Figure 9. World Yields in Metric Tons per Hectare, and Harvested Area Devoted to Major Oilseeds, 1979-80 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

Table 9. Soybean Area Harvested in Millions of Hectares in Major Producing Countries in 1987-88 and Comparisons with Selected Recent Years.

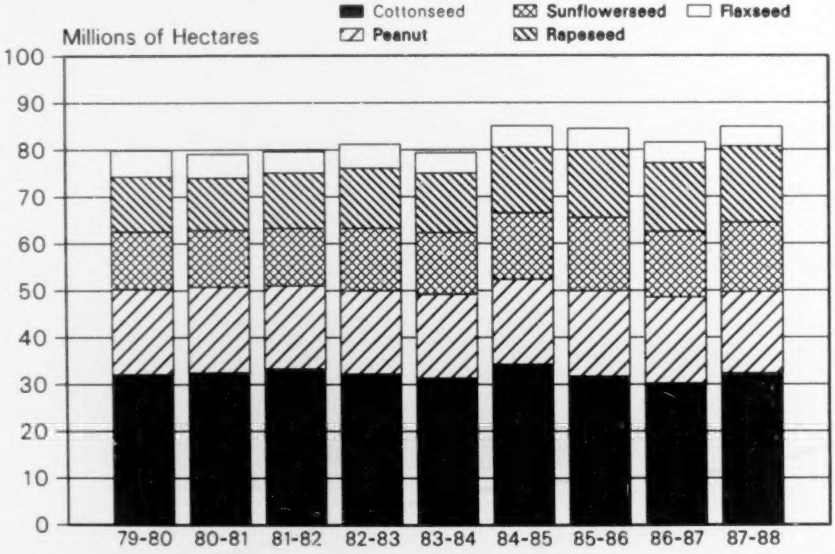
Area	1970-71	1975-76	1983-84	1984-85	1985-86	1986-87	Prelim. 1987-88	Percent Change from 1970-71 to 1987-88
U.S.	16.7	20.8	25.3	26.8	24.9	23.6	22.8	+ 37
Brazil	1.3	5.8	9.3	10.1	9.5	9.3	10.4	+ 700
Argentina	0.03	0.4	2.9	3.3	3.4	3.5	4.2	+ 13,900
China	8.0	8.8	7.6	7.3	7.7	8.3	8.4	+ 5
Canada	0.1	0.2	0.4	0.4	0.4	0.4	0.5	+ 360
Paraguay	0.4	0.2	0.4	0.6	0.6	0.5	0.6	+ 53
Total	26.53	36.2	45.9	48.5	46.5	45.6	46.9	+ 77

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 6-82, May 10, 1982; WCP 4-85, April 11, 1985; WCP 5-86, May 12, 1986; WCP 7-87, July 1987; WCP 12-87, December 1987; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83, April 1983; FOP 4-84, April 1984; *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

demand for protein meal. With indications of a strong long-term upward trend in production of high oil content oilseeds such as palm products,[9] soybeans' comparative advantage will be in the protein sector. Unlike most other oilseeds, soybeans have a relatively low oil content and high protein meal yield per ton. Long-term growth in protein meal demand will depend on several key variables, including global economic growth rates, the exchange rates of the U.S. dollar, adjustments of developing nations to debt problems, and the trend in protein content of livestock and poultry rations in the Soviet Union. Present indications are that world economic growth will trend modestly upward, the U.S. dollar will remain well below previous highs for the next few years, and increased priority will be placed on the use of protein meal in Soviet meat and poultry production. These trends have brought an improvement in soybean prices relative to those of grains, and should generate an upward trend in soybean plantings in the U.S. in the next year or two along with a moderate upward trend in South America.

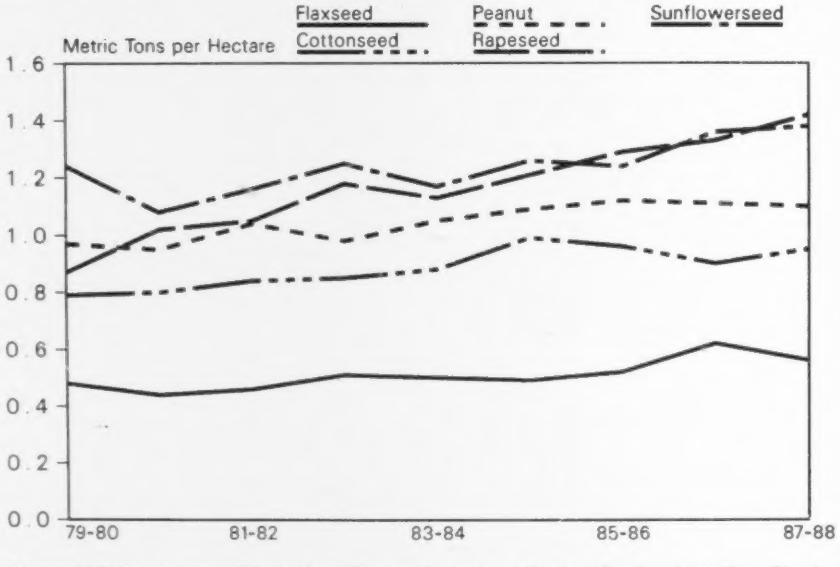
Figure 12 shows the long-term upward trend in U.S. soybean yields. Since the early 1950s, yields in the U.S. have shown an average yearly increase of 0.33 bushels per acre (0.022 metric tons per hectare). Except for occasional interruptions due to adverse weather, this trend appears likely to continue during the next several years as currently available technology and management practices are applied to a larger portion of the planted area. Included in this category are row spacings, variety selection, pest, disease and weed control, timing of field operations, fertilization programs, tillage practices, and harvesting procedures to minimize field losses. Similar trends appear likely in yields and application of technology and management practices in South America, China, Canada, and other soybean producing nations in the next few years, given favorable weather during the planting and growing seasons.

Figure 10. World Area Harvested in Millions of Hectares of Selected Oilseeds, 1979-80 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

Figure 11. World Yields in Metric Tons per Hectare of Selected Oilseeds, 1979-80 through 1987-88.



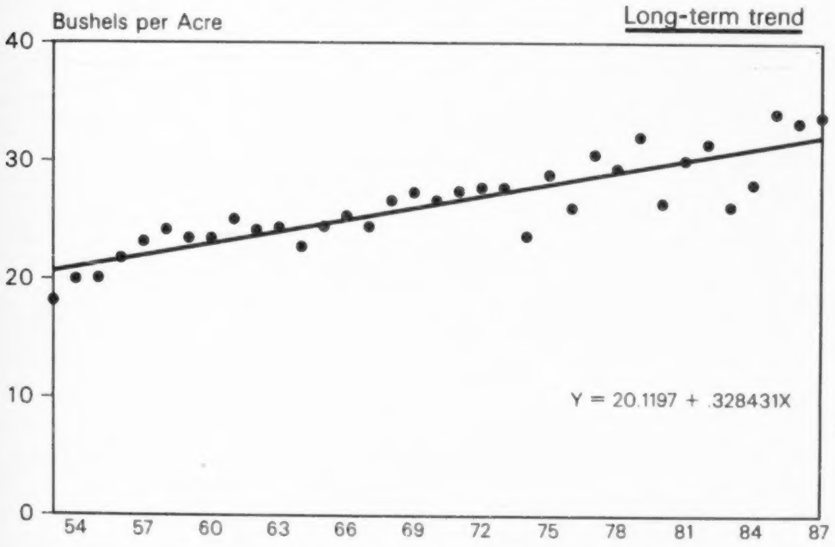
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

Table 10. Comparative Yields in Metric Tons per Hectare of Selected Soybean Producing Countries.

Area	1975-76	1979-80	1983-84	1984-85	1985-86	1986-87	Prelim. 1987-88
U.S.	1.94	2.16	1.76	1.89	2.29	2.24	2.27
Canada	2.32	2.37	2.02	2.26	2.47	2.50	2.75
Argentina	1.60	1.80	2.41	2.06	2.20	2.08	2.14
Brazil	1.72	1.73	1.65	1.80	1.49	1.87	1.73
Australia	1.73	1.83	1.85	1.75	1.34	1.66	1.74
World	1.65	1.82	1.64	1.73	1.86	1.90	1.90

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-78, April 1978; FOP 5-83, May 1983; *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; *Foreign Agriculture Circular, World Crop Production*, WCP 4-82, April 12, 1982; WCP 3-84, March 9, 1984; WCP 4-85, April 1985; WCP 4-86, April 1986; WCP 7-87, July 1987; *Foreign Agriculture Circular, World Agricultural Production*, WAP 1-88, January 1988; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

Figure 12. U.S. Soybean Yields in Bushels per Acre, 1953-87.



Source. U.S. Department of Agriculture, Statistical Reporting Service, Crop Reporting Board, *Crop Production 1987 Summary*, crpr 2-1 (1988), January 1988; *Field Crops*, Statistical Bulletin No. 708, and various other issues.

World Livestock and Poultry Meat Production Trends

World meat production since the mid-1950s has been sensitive to trends in consumer incomes of rapidly developing and industrialized nations, and has been an important influence on demand for coarse grains, protein meal, and other feed ingredients. Rising consumer incomes have tended to bring increased production and consumption of red meat and poultry. This trend was especially evident in rapidly developing nations in the 1960s and 1970s, but has been followed by much slower growth in global meat production in the 1980s. The recent slower growth rate reflects sluggish world economic growth, as well as health concerns and changing dietary trends in the U.S. and other areas. Slower expansion of meat production, in turn, has been an important contributor to less rapid expansion in consumption of coarse grains and protein meal and has been a restraint on prices of these commodities.

Pork Production Up, Beef Down

Table 11 shows pork production trends in major producing countries since the 1970s. Preliminary projections place 1988 world production 3.2 percent higher than last year and 14 percent larger than in 1983. With world population expanding at about 2 percent per year, per capita production is increasing slightly in 1988 and is expected to be moderately above the level of seven years earlier. Pork production is expected to decline slightly in 1988 in Brazil and parts of Eastern Europe, but will likely be above the previous year in the EC, North America, China, and Japan. In contrast to slightly reduced North and South American pork production in the last decade, pork production has shown a moderate long-term upward trend in the EC and the USSR and a strong upward trend in China and other Asian nations. After a substantial reduction in East European pork production in the early 1980s in response to severe debt and financial problems, that area's production rose slightly from 1983 to 1987. Preliminary projections indicate the expansion may continue in 1988 in most East European countries.

In contrast to pork, world beef production is expected to decline slightly again in 1988, with the sharpest reductions occurring in the EC, Argentina, New Zealand, the U.S., and Canada (see Table 12). Global production is projected to decline 0.5 percent from 1987. Production at the projected level would be 5.8 percent above seven years earlier, but would leave per capita consumption 6 to 7 percent below that same year. Mexico, Brazil, and the USSR are expected to deviate slightly from 1988 trends of other major beef-producing countries. Production is expected to increase by about 5 percent in the USSR in 1988, along with increases of 15 percent for Mexico and 4 percent for Brazil.

Continued Upward Trend in Global Poultry Production

Global poultry meat production and consumption have increased every year since 1979 in response to growing consumer incomes, consumer desire for more variety in diets, and a wider range of poultry meat products being made available by processors (see Table 13). World production in 1988 is projected to rise 3.5 percent above 1987. At that level, world production will be more than four-fifths larger than the 1974-78 average, and per capita production will be up approximately 42 percent from the same time period. Increased production is expected in 1988 in nearly all major producing areas in response to growing consumer demand.

Table 11. Pork Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1984 through 1988 in Millions of Metric Tons.

Area	1974-78 Average	1980	1981	1984	1985	1986	Prelim. 1987	Forecast 1988
U.S.	5.9	7.5	7.2	6.7	6.7	6.4	6.4	7.1
Other N. America	1.5	1.8	1.7	1.8	1.8	1.8	1.8	1.9
S. America	1.0	1.2	1.2	0.8	0.8	1.0	1.3	1.0
EC-12	9.0	10.3	10.7	11.1	11.2	11.5	11.7	11.8
Other W. Europe	1.1	1.3	1.1	1.1	1.2	1.2	1.1	1.1
E. Europe	6.3	6.9	6.6	6.5	6.7	6.8	6.8	6.8
USSR	5.2	5.2	5.2	5.9	5.9	5.9	5.9	5.9
Asia (Exc. PRC)	2.0	2.7	2.6	3.0	3.2	3.3	3.4	3.5
Oceania	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4
China (PRC)	8.7[b]	N.A.	11.9	14.4	16.5	18.0	17.0	18.1
World Total[a]	32.2	37.0	48.4	51.7	54.0	56.0	55.8	57.6

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; and FL&P 1-87, September 1987.

[a] Totals may not add due to rounding.

[b] Average production for 1976-80.

Table 12. Beef and Veal Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1984 through 1988 in Millions of Metric Tons.

Area	1974-78 Average	1980	1981	1984	1985	1986	Prelim. 1987	Forecast 1988
				(Carcass Weight)				
U.S.	11.5	10.0	10.4	10.9	11.0	11.3	10.8	10.3
Other N. America	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.4
S. America	6.1	6.3	6.6	6.1	6.5	6.2	6.2	6.2
EC-12	7.1	7.5	7.5	7.9	7.8	8.0	8.0	7.8
Other W. Europe	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.6
E. Europe	2.5	2.5	2.3	2.5	2.7	2.5	2.5	2.4
USSR	6.7	6.6	6.6	7.2	7.4	7.7	8.1	8.5
S. Africa	0.5	0.6	0.5	0.7	0.6	0.6	0.6	0.6
Asia (Excl. PRC and India)	0.8	1.0	1.0	1.0	1.1	1.2	1.2	1.2
Oceania	2.4	2.0	1.9	1.7	1.8	1.9	1.9	2.0
Total	40.4	39.4	39.7	41.0	42.0	42.3	42.2	42.0

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; and FL&P 1-87, September 1987.

Table 13. Total Poultry Meat Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1984 through 1988 in Millions of Metric Tons.

Area	1974-78 Average	1980	1981	1984	1985	1986	Prelim. 1987	Forecast 1988
U.S.	5.3	6.6	6.9	7.4	7.9	8.3	9.0	9.5
Other N. America	0.8	1.0	1.1	1.2	1.2	1.2	1.2	1.2
S. America	1.0	1.8	2.0	2.0	2.2	2.4	2.7	2.8
EC-12	4.2	4.8	5.2	5.2	5.3	5.4	5.5	5.6
Other W. Europe	0.1	1.2	0.2	0.2	0.2	0.2	0.2	0.2
E. Europe	1.6	1.9	2.0	2.0	1.9	2.0	2.0	2.0
Soviet Union	1.5	2.1	2.3	2.7	2.8	2.9	3.1	3.3
Africa and Middle East	0.4	0.6	0.9	1.5	1.6	1.6	1.7	1.7
Japan	0.9	1.2	1.1	1.3	1.4	1.4	1.5	1.5
Other Asia and Oceania	0.3	0.4	0.8	1.6	1.7	1.8	1.9	2.0
Total	16.1	21.6	22.5	25.1	26.2	27.2	28.8	29.8

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986, and FL&P 1-87, September 1987.

U.S. Shares of Wheat and Coarse Grain Trade Rise Substantially

Preliminary data indicate U.S. shares of global wheat and coarse grain trade increased substantially in 1987-88 for the second consecutive year. These increases followed sharp downtrends of four years for wheat and six years for coarse grains that ended in 1985-86. For wheat, the U.S. share of global exports (excluding intra-EC trade) reached an estimated 42 percent in 1987-88, compared with 30 percent in 1986-87 and 29 percent in 1985-86. The U.S. share of coarse grain trade rose to 63 percent in 1987-88, compared with 55 percent in 1986-87 and 44 percent in 1985-86. The U.S. wheat export share reached a peak of approximately 50 percent in the early 1970s and was in an irregular downward trend from that time until 1985-86 (see Figure 13). The U.S. coarse grain export share trended up in the 1970s, surging to a peak of 71 percent in 1979-80 (see Figure 14).

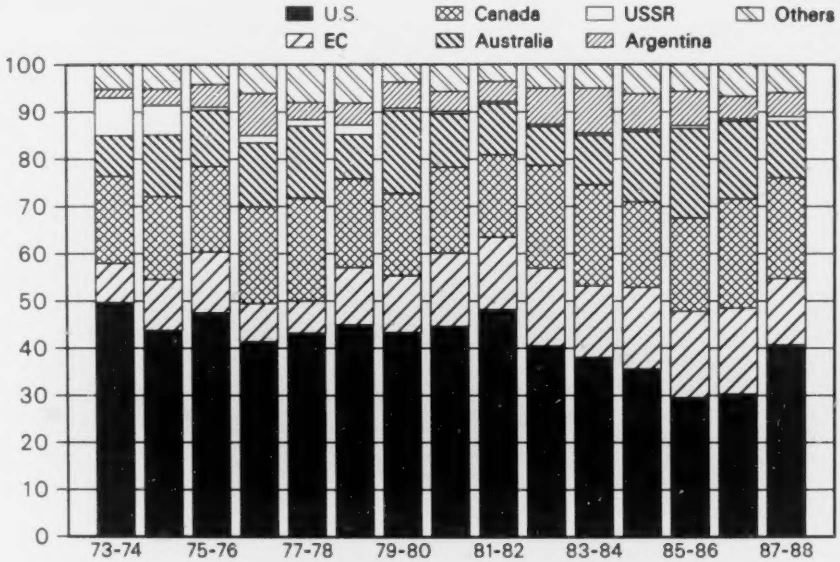
The increased U.S. trade shares in the last two years are due to a decline in total non-U.S. exports of wheat and coarse grain, after substantial increases in the first half of the decade. The largest decline has been in non-U.S. exports of coarse grains. The trends in the early 1980s reflected large foreign grain supplies and aggressive pricing by most other exporters. The rapid decline in U.S. trade shares in the early 1980s was a key factor triggering major changes in U.S. farm price support policies and export programs that were implemented in mid- to late 1986 and continued through 1988.

Competition in wheat exports in the last few years has been especially strong from the EC, Australia, and Canada. However, export shares obtained by all three areas or countries decreased modestly in 1987-88. Among other major non-U.S. wheat exporters, Argentina's trade share increased by 0.5 percent in 1987-88 due to more favorable weather and increased production. The EC's wheat exports are slightly less than half as large as the combined exports of Canada and Australia, and its share of world wheat trade (excluding intra-EC trade) has declined from 16.5 percent in 1982-83 to its present 14.2 percent share. However, the Australian market share has increased significantly in the same time period, rising from 8.2 percent five years earlier to a preliminary estimate of 12 percent in 1987-88.

Long-Term Trend in Wheat Trade Patterns

From a longer-term perspective, the U.S. share of global wheat trade increased

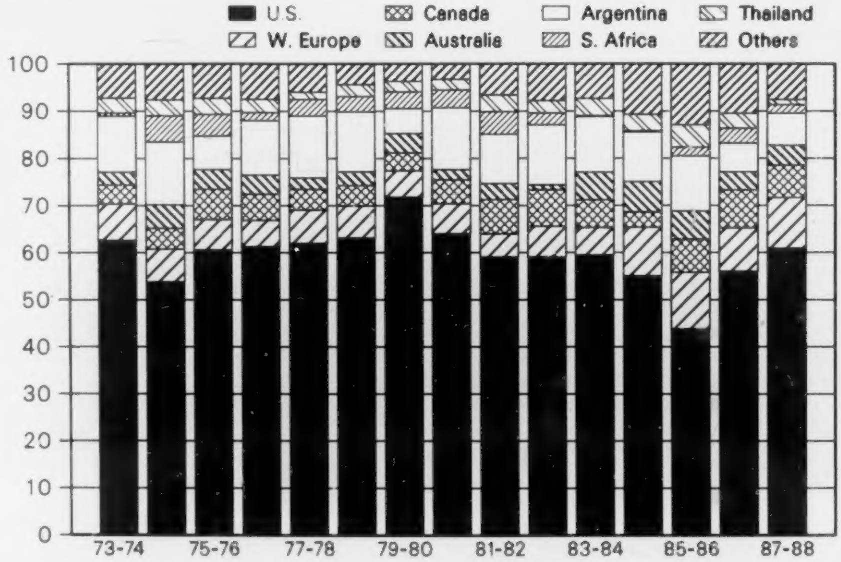
Figure 13. Percentage Shares of World Wheat Exports by Major Exporters, July-June 1973-74 through 1987-88.[a]



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

[a] From 1982-83 on, the EC is EC-12.

Figure 14. Percentage Shares of World Coarse Grain Exports by Major Exporters, 1973-74 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues. Marketing year data were accumulated on a July-June basis from 1970-71 through 1978-79. The USDA switched to an October-September fiscal year starting in 1979-80.

rapidly in the early 1970s as U.S. wheat growers and the U.S. grain trade responded quickly to rising world demand. Profits from expanded world demand and rising prices, as well as changing government programs, brought more than a 50 percent increase in planted U.S. wheat area in only four years. A private enterprise economic system, combined with increased grain merchandising profits, quickly generated additional investments to expand U.S. grain handling and transportation capacity, thus enabling increased production to be moved into export markets. Along with these developments, a depreciation of the U.S. dollar increased the purchasing power of foreign buyers, as well as the competitiveness of U.S. wheat relative to that of foreign competitors. Meanwhile, with a time lag, foreign wheat production began to rise due to increased use of fertilizer, higher yielding varieties, and increased plantings in some areas. This was particularly true in the EC and Argentina, which both experienced steadily increased wheat export shares in the late 1970s and early 1980s. Trade shares of the other two major wheat exporters, Canada and Australia, fluctuated significantly from year to year due to more variable climatic conditions and a resulting greater variability of production.

In the next few years, the U.S. appears likely to experience at least a slight additional increase in its wheat export share due to changing U.S. trade, grain reserve, and price support policies, and the lower exchange rate of the U.S. dollar relative to foreign currencies of importers. The EC farm policies continue to be directed toward generating surpluses in grain production, with internal price supports that encourage production, discourage consumption, and subsidize exports. Even with increased EC wheat feeding, a slight decrease in its internal support prices, and an optional small-scale land set-aside program, the EC likely will continue to offer strong competition in world wheat trade. In addition, Argentina has recently reduced its grain export taxes and also has a tax on idle farmland.[10] Both developments should encourage Argentine grain production near recent levels, although uncertain grain prices relative to livestock may cause some marginal land to be shifted back to pasture and livestock production in the next few years. Also, Canada has taken steps to expand its grain handling and transportation capacity, with the stated goal of sharply increasing its grain exports. These developments continue to be met by aggressive U.S. grain export programs, as will be noted in the policy section of this report.

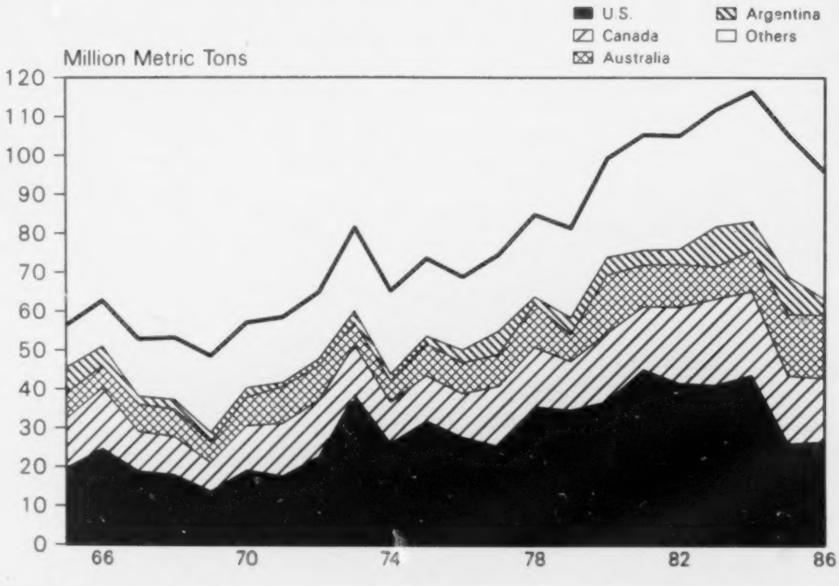
Coarse Grain Export Shares

After temporarily surging upward in 1970-80, the U.S. share of global coarse grain trade (excluding intra-EC trade) dropped back to about the 60 percent level for the next four years. That was approximately the same trade share the U.S. had obtained during the 1972-73 to 1978-79 period. The U.S. share of world coarse grain trade declined in 1984-85 and 1985-86, reaching a low of 44 percent in 1985-86, before rising over the past two years to slightly over 63 percent in 1987-88. The 44 percent in 1985-86 represented the lowest U.S. share of global coarse grain exports since 1971-72. Declining U.S. corn and coarse grain trade shares in the early 1980s reflected an increasing share of global exports originating in Western Europe, as well as continued corn and sorghum exports from China (included in the "Others" category in Figure 14). The increased U.S. coarse grain export share in 1986-87 and 1987-88 reflected sharply lower U.S. corn prices as a result of changes in American farm and trade policies. It also reflected serious weather problems in parts of the Southern Hemisphere, Eastern Europe, and South Asia in 1987, as well as growing Chinese demand for grain, which reduced that country's exportable supply of coarse grains.

South Africa's corn crop was struck by severe drought in 1983, 1984, and 1987, which sharply reduced that nation's exports in those years. Somewhat improved weather and increased 1985 and 1986 production allowed that nation to resume modest corn exports in those years, although exports still were below earlier peak levels. As shown in Figure 14, export shares of most other major coarse grain exporters, including Canada, Australia, Thailand, and Argentina, have varied considerably from year to year. These nations normally do not carry reserve grain stocks; thus weather fluctuations are a major factor behind year-to-year variations in their shares of world coarse grain trade.

Figure 17 shows the dramatic rise in U.S. corn exports in the 1970s, while non-U.S. exports during the same period remained relatively stable. From 1979-80 to 1985-86, however, U.S. corn exports fell by 50 percent, while corn exports from all other nations as a group rose by over 80 percent. The sharp decline in U.S. exports brought severe financial pressures to U.S. grain producers, grain and farm supply firms, the U.S. grain transportation industry, and port elevators. Since 1985-86, corn exports by non-U.S. exporters as a group have fallen by about one-third, due largely to reduced

Figure 15. World Wheat Exports by Country of Origin, Calendar Years 1965-86.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

exports from China, Thailand, and Argentina.

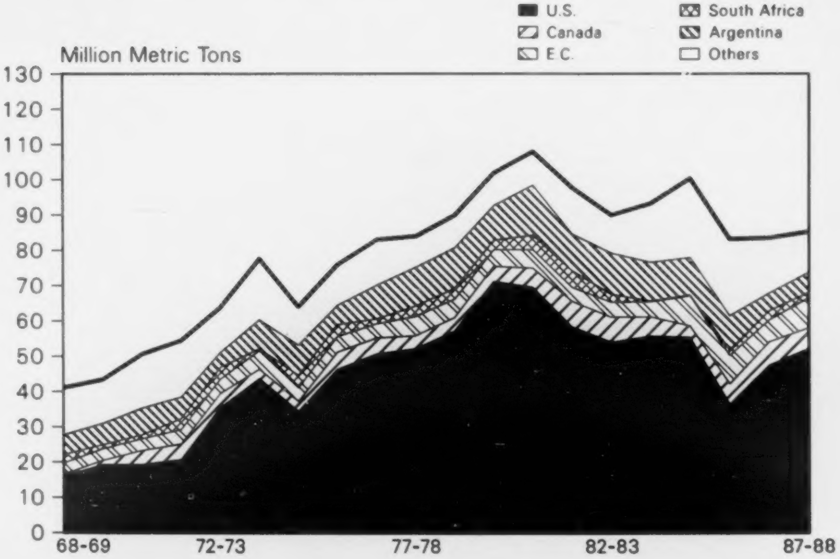
Prospects for the U.S. share of coarse grain exports in the next few years remain somewhat uncertain and will depend on: (1) U.S. price support, grain reserve, and acreage control policies; (2) exchange rates of the U.S. dollar against foreign currencies; (3) Soviet grain production and consumption; (4) world economic growth rates; and (5) weather in major U.S. and foreign coarse grain exporting areas. At this writing, the U.S. coarse grain crop is being sharply reduced by drought which may cause a temporary reduction in the U.S. share of global exports. However, barring prolonged weather problems, demand indicators point to slightly increased global coarse grain exports through the late 1980s and early 1990s. If this proves correct, U.S. corn and coarse grain exports in the next few years likely will continue to face significant but less intense foreign competition than in the early 1980s. Changing U.S. farm policies should help to at least slightly increase the U.S. share of world coarse grain trade in the 1990s from the already substantial recovery that has occurred through 1987-88.

In the event of a sharp upturn in world trade in the next few years, U.S. corn and coarse grain exports almost certainly could be increased more rapidly than those of foreign competitors, with a resulting sharp increase in the U.S. trade share. Unlike most other coarse grain exporting nations, the U.S. has substantial excess handling and exporting capacity, and a large amount of land currently being idled from production that could quickly be used to meet expanding world demand.

Figures 16 and 17 illustrate that despite the lower level of world exports of the last few years, U.S. corn and coarse grain exports are of major importance to foreign livestock industries. U.S. corn exports now account for 7 out of every 10 tons traded in world markets and nearly two-thirds of all coarse grains moving into international trade. These grains are used primarily for livestock and poultry feed in industrial and rapidly developing nations.

Other major coarse grain exporters include Argentina, France, Canada, and Thailand. It is questionable whether South Africa will regain its former position as the world's third-ranking corn exporter in the next few years, since government policies in that country have not provided strong incentives for expanded production. Despite policies

Figure 16. World Coarse Grain Exports by Country of Origin, Trade Years 1968-69 through 1987-88.[a]

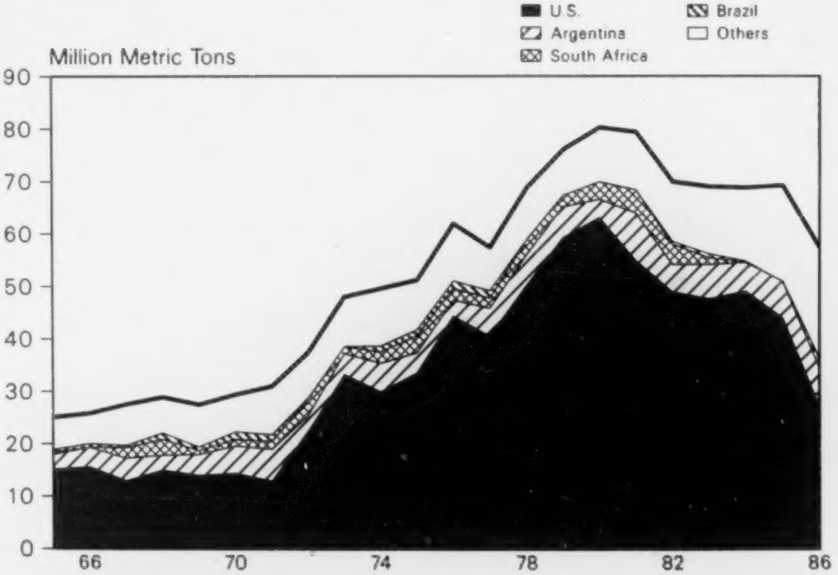


Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

[a] Trade data in this table are on a July-June trade year through 1980-81. From 1980-81 on, the trade year is October-September.

[b] Trade data as expressed in this table exclude intra-EC trade.

Figure 17. World Corn Exports by Country of Origin, Calendar Years 1965-86.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

intended to encourage Brazil to return to its former corn export position of the 1960s and early 1970s, it has remained a net corn importer most of the time during the 1980s. Recent performance suggests Brazil is likely to have difficulty maintaining a net export position in corn on a consistent basis in the next few years. Restraints on Brazilian production potential include more attractive alternatives in competing crops, high costs of fertilizer and other purchased inputs, and difficulties of accumulating capital and financing production in a high-inflation economy.

Soybean and Soybean Product Trade Shares

Soybeans

The U.S. share of global soybean trade has been somewhat variable in recent years. It declined substantially in 1983-84 and 1984-85, turned temporarily upward in 1985-86, but declined again in 1986-87 and 1987-88 (see Figure 18). Preliminary data place the current U.S. share at 73 percent, down from an average of slightly over 80 percent in the 1975-76 through the 1983-84 period. The recent decline in the U.S. share of global soybean trade has resulted from increased exports by Argentina, Brazil, and Paraguay. Other contributing factors behind the decline include the strong U.S. dollar in the 1981-88 period relative to South American currencies, and U.S. price support programs that at times have restricted the competitiveness of U.S. soybeans, both in international markets and in competing for cropland with other major crops produced in the U.S.

U.S. soybean and soybean meal exports are affected by a wide range of factors. For example, much of the decline in U.S. and world exports in 1983-85 reflected reduced demand for soybeans and soybean meal in Western Europe. Factors contributing to that area's reduced demand included: (1) an aggressive EC program to reduce surplus dairy production; (2) increased wheat feeding, with a resulting decline in protein meal needs since wheat has a higher protein content than corn (maize); (3) a stabilizing of other EC livestock and poultry production; (4) large imports of U.S. corn gluten feed and meal as an alternative protein source; and (5) a sharp increase in EC oilseed production. In addition, the U.S. dollar has at times placed U.S. soybeans and meal at a competitive disadvantage relative to foreign supplies, and debt problems have restrained demand growth in Eastern Europe and developing nations. These restraints on world soybean exports eased somewhat starting in 1985-86 and continuing through 1987-88.

The U.S. soybean trade share in the next few years will be influenced strongly by U.S. price support programs and the extent of growth in foreign demand for beans and meal. With relatively modest growth in world demand and no changes in price supports, the U.S. trade share can be expected to remain under pressure from South American competition. But with accelerated demand growth and/or substantially restructured U.S. price support programs, U.S. producers likely would be able to expand production more quickly and more aggressively than their foreign counterparts, thus increasing the U.S. share of world trade.

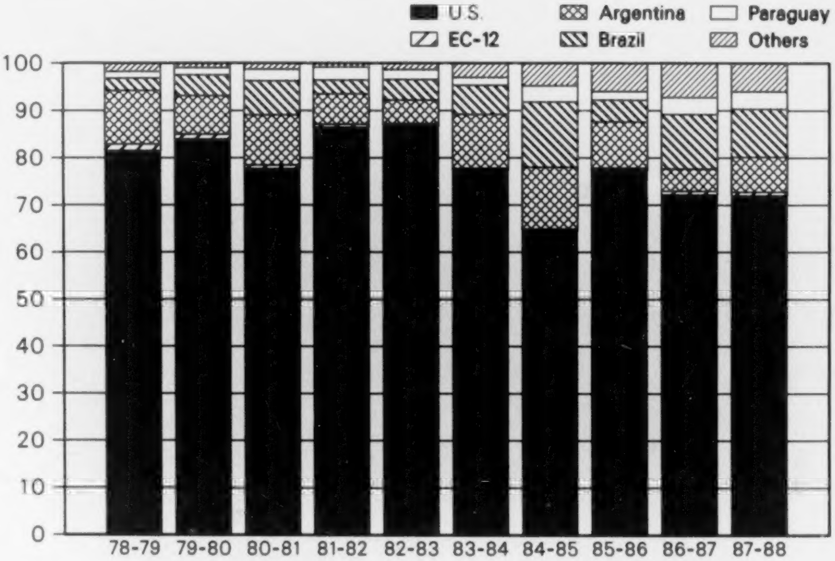
Figure 19 shows the long-term trend in exports of soybeans by the U.S. and other exporting nations, including the expanded South American exports and sizable year-to-year fluctuations in global exports. World soybean trade has experienced some brief periods of decline, but has shown a remarkable capacity to rebound when global economic growth resumes its upward trend. Rising consumer incomes are closely linked with increased demand for livestock and poultry products, and have a strong tendency to generate increased demand for protein meal. An additional influence on future export trends is Soviet agricultural policies, including the priority given to protein meal imports by that nation (see USSR section of this report). Given that the average protein content of Soviet livestock and poultry rations is well below Western standards, and the agricultural background and training of the current Soviet leadership, it appears likely that soybean and/or protein meal imports by the USSR will increase significantly in the next several years.

Soybean Meal

The U.S. share of world soybean meal exports has approximately stabilized the past three years, after trending downward since the late 1970s (see Figure 20). While nearly three-fourths of the soybeans traded in world markets are produced in the U.S., only about one-fourth of the soybean meal traded in world markets originates from U.S. processing plants. With strong foreign competition and sluggish global demand for protein meal, U.S. soybean meal exports in 1984-85 for the first time dropped below those of both the EC and Brazil. Since then, U.S. exports have moved moderately above those for the EC but are only about four-fifths as large as Brazil's soybean meal exports. In addition, Argentina has expanded its soybean processing capacity in recent years and additional capacity expansions are occurring there in 1988. Thus, Argentina's share of world soybean meal trade has increased sharply in the past five years and likely will increase further in the years ahead. A high percentage of the soybeans processed in the EC are of U.S. origin, since climatic limitations have kept that area's domestic production at extremely low levels. Spain and Portugal account for much of the soybean meal exports in the "Others" category of Figure 20, for years prior to 1986-87. Since 1986-87, they are included in the EC category. These two nations joined the EC on January 1, 1986.

From a longer-term perspective, Brazil's share of world soybean meal exports has

Figure 18. Percentage Shares of World Soybean Exports by Major Exporters, October-September 1978-79 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

fluctuated from year to year due to variations in its production. The decline in the U.S. soybean meal trade share since the late 1970s has come primarily from the EC (including Spain and Portugal) and from Argentina. Increased trade shares by these areas reflect their governments' policies, which are designed to encourage exports of value-added products such as soybean meal and soybean oil. Value-added exports enable processing nations to benefit from increased domestic employment and to retain any profits resulting from processing operations. Policies used to encourage such trade patterns include larger export taxes on beans than on bean products in South America, and modest import taxes on soybean oil in the EC nations.[11]

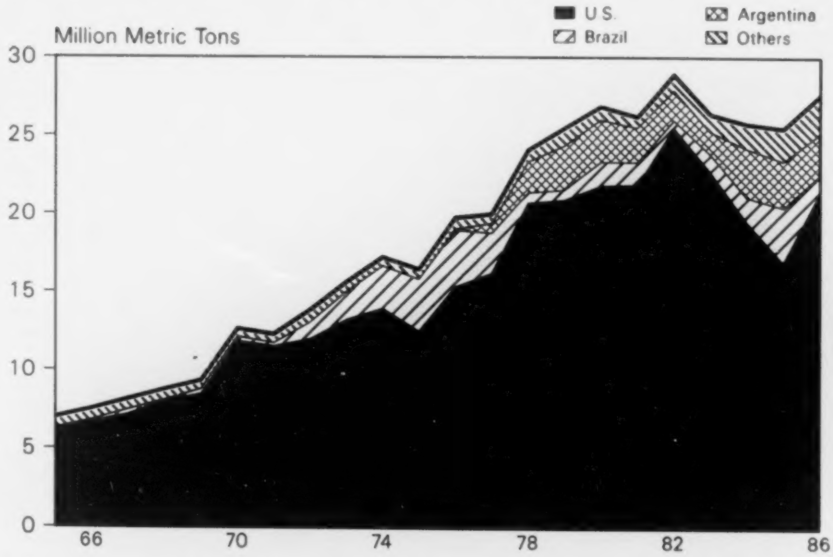
Trade policies of these competing meal exporting nations are strongly entrenched. With excess world processing capacity, the U.S. soybean processing industry likely will face intense competition in its efforts to maintain or expand its share of global soybean meal trade. In contrast to U.S. soybean export shares, the excess foreign processing capacity would make it difficult for the U.S. meal trade share to rebound sharply even in case of a strong recovery in world soybean meal demand.

Soybean Oil

The U.S. share of global soybean oil exports has followed a pattern similar to that for soybean meal, except that the soybean oil share declined moderately in 1986-87 but rebounded sharply in 1987-88 with expanded U.S. government export assistance programs (see Figure 21). The U.S. ranked second in soybean oil exports in 1987-88, behind the EC. Argentina's share has increased rapidly since the early 1980s and may well continue to trend irregularly upward into the early 1990s as its soybean production and processing capacity expand. Competition from EC and Brazilian processing industries will depend heavily on trade policies of those areas, as well as on trends in Brazilian soybean production and domestic soybean oil consumption. With no major changes in trade policies, U.S. soybean oil exports appear likely to face continued strong competition in the years ahead.

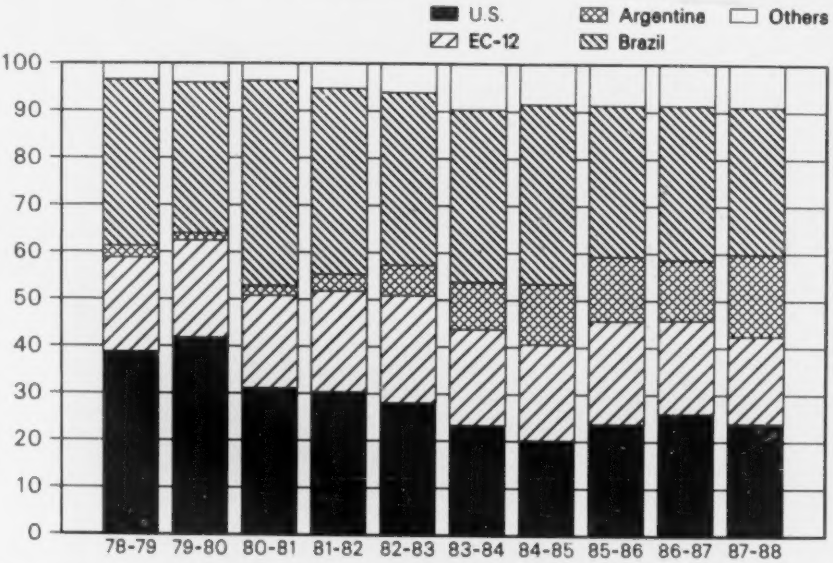
Figures 22 and 23 show exports of soybean meal and oil by major exporters since the mid-1960s. World soybean meal and oil trade patterns show only slightly increased

Figure 19. World Soybean Exports by Country of Origin, Calendar Years 1965-86.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

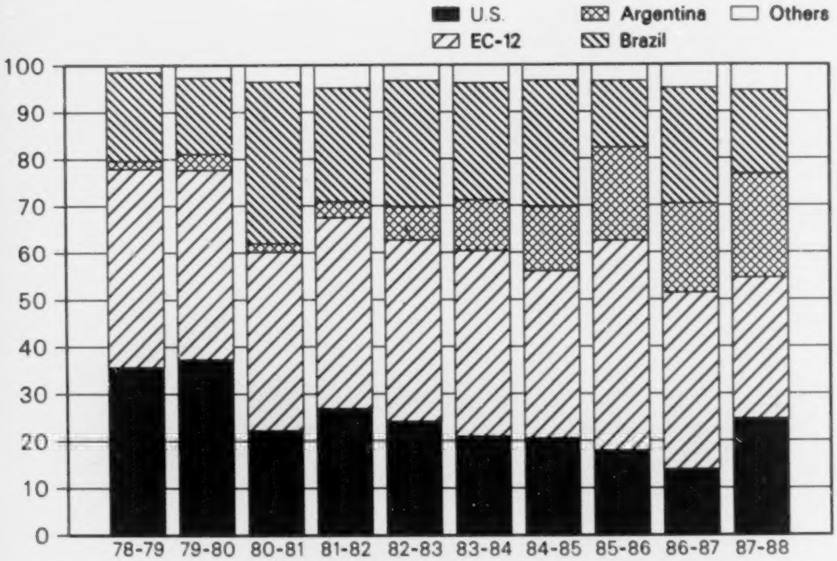
Figure 20. Percentage Shares of World Soybean Meal Exports by Major Exporters, October-September 1978-79 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

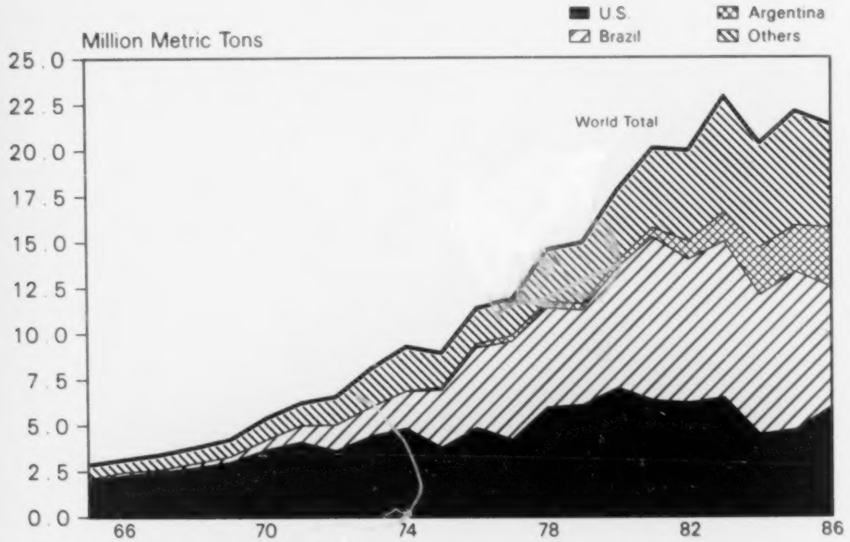
U.S. exports over this time period and sharply expanded exports by Brazil, Argentina, and other nations. The "Others" categories in Figures 22 and 23 consist mainly of the EC (including Spain and Portugal). U.S. and South American soybeans are processed in EC countries and a portion of the resulting meal and oil production is re-exported. This pattern indicates the U.S. soybean processing industry has been denied participation in much of the growth in world demand for its value-added exports. It also helps to explain increasing concern in the U.S. about foreign oilseed processing policies.

Figure 21. Percentage Shares of World Soybean Oil Exports by Major Exporters, October-September 1978-79 through 1987-88.



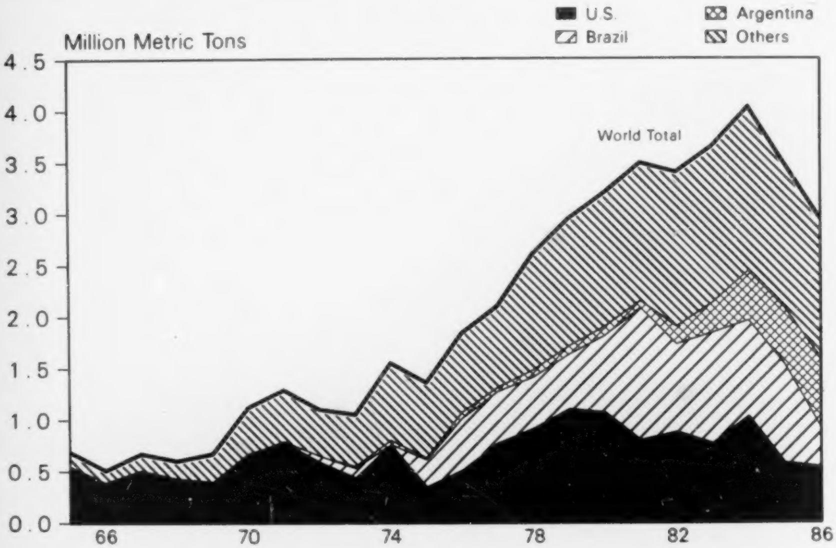
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; various other issues.

Figure 22. World Soybean Meal Exports by Country of Origin, Calendar Years 1965-86.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

Figure 23. World Soybean Oil Exports by Country of Origin, Calendar Years 1965-86.



Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

Trade Shares in Livestock Product Exports

Beef and Veal Exports

The U.S. share of world beef and veal exports has increased over the past 15 years, but a significant decrease is expected in 1988. The U.S. beef and veal exports still represent less than 5 percent of world trade and are dwarfed by much larger exports from Australia, New Zealand, Brazil, Argentina, and the EC. One reason for the limited U.S. beef exports is that most of the world's beef trade is in lower quality products rather than the highly finished beef typically produced in the United States. The U.S. beef export share was 7.2 percent of world trade in 1987 (excluding intra-EC trade) and is expected to decline to about 4.8 percent in 1988. Comparable figures including intra-EC trade would be 5.3 and 3.6 percent, respectively. As shown in Figure 24, that compares with a U.S. trade share of only 0.8 percent in 1973.

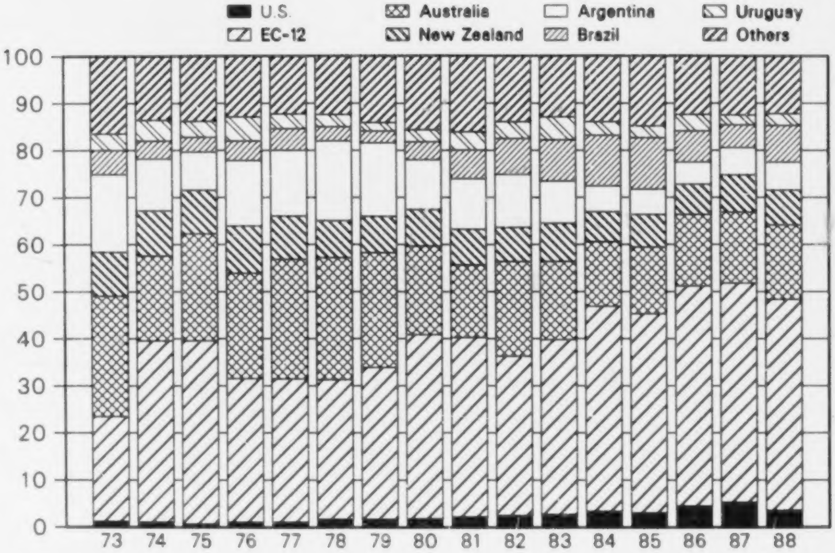
Major non-U.S. exporters of beef in order of size include the EC, Australia, Brazil, New Zealand, Argentina, and Uruguay. The substantial long-term growth in the EC's share of world beef exports since 1973 has come largely at the expense of Argentina, Uruguay, and New Zealand. Sizable yearly fluctuations in exports from Australia and Argentina reflect an unstable climate in those areas, with herd liquidation tending to increase supplies and depress prices during drought years. Conversely, when pasture and range conditions are favorable, producers tend to retain animals to rebuild herds, with a resulting temporary decline in beef supplies and exports.

Australia was in a herd expansion phase from late 1983 through 1985, after experiencing severe drought and herd liquidations in the early 1980s. Argentina's declining export share at least partially reflects that country's increased emphasis on wheat, corn, sorghum, sunflowerseed, and soybean exports as sources of foreign exchange earnings to help service its large external debt, and a resulting decrease in the amount of land devoted to pasture.

Pork Export Shares

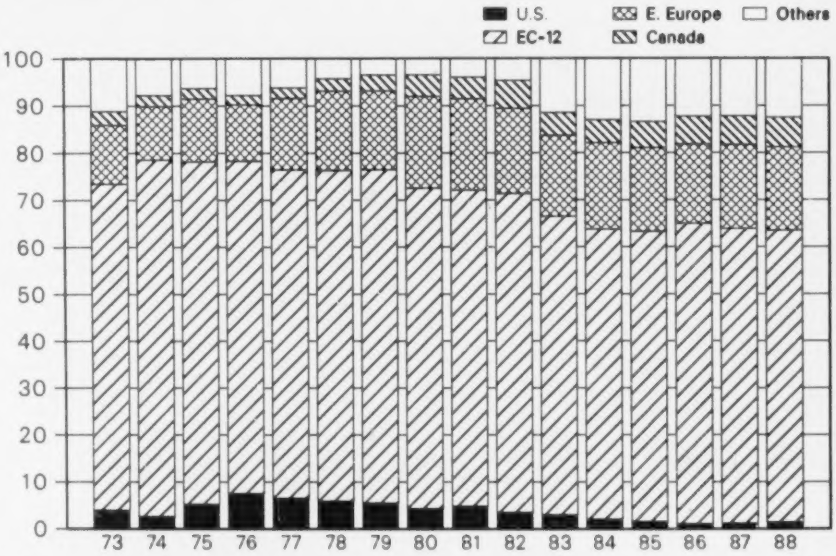
The EC also is the world's largest pork exporting area, as shown in Figure 25. If intra-EC exports are included, its exports since 1970 have accounted for 61 to 77 percent of world pork trade. Excluding intra-EC trade, its share of global pork exports in recent years has fluctuated from 16 to 24 percent. However, the EC's share of global exports has trended slightly downward since the mid-1970s. During the same period, Canadian, Chinese, and East Euro-

Figure 24. Percentage Shares of World Beef and Veal Exports by Major Exporters, 1973-88 Calendar Years.[a]



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 1-87, September 1987; various other issues; *Foreign Agriculture Circular, Livestock and Meat*, FLM 2-81, February 1981; various other issues.
[a]Includes intra-EC trade. From 1983 on, the EC is EC-12.

Figure 25. Percentage Shares of World Pork Exports by Major Exporters, 1973-88 Calendar Years.[a]



Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 1-87, September 1987; various other issues; *Foreign Agriculture Circular, Livestock and Meat*, FLM 2-81, February 1981; various other issues.
[a]Includes intra-EC trade.

pean exports shares have increased slightly. The U.S. pork export share reached a peak in 1976 and declined gradually for several years until 1987, partly because of strong European and Canadian competition. The U.S. share of world pork exports is expected to be approximately 1.4 percent in 1988, less than one-third as large as the record 1976 trade share. While some growth in U.S. pork exports is possible in future years if the U.S. dollar maintains a realistic level in foreign currency markets, U.S. producers continue to face sizable import barriers in other countries and strong competition from other pork exporting nations.

Poultry Meat Export Shares

As shown in Table 14, the U.S. share of world poultry meat exports rebounded sharply in 1987 after being in a downward trend from 1981 through 1985. Poultry meat exports from the U.S. in 1987 accounted for approximately 26 percent of the world total, up from 20 percent in 1980. The U.S. poultry meat export share is expected to decline slightly in 1988 due to increased competition from the EC and Eastern Europe. World poultry meat exports trended slightly downward in 1984 and 1985 as importing nations struggled with slower rates of economic growth and debt burdens. The declining U.S. trade share at that time was influenced by the strong U.S. dollar and a resulting increase in cost to foreign buyers for purchases of U.S. poultry. Since 1985, global exports have again resumed a slight upward trend. Impediments to U.S. poultry meat exports from an over-valued dollar also have been removed. But at the same time, debt pressures and high real interest costs have encouraged Brazil and Eastern Europe to place greater emphasis on value-added exports as a means of earning foreign exchange. Also, a strong shift in dietary patterns from red meat to poultry meat in the U.S. may have temporarily reduced the availability of poultry meat for export. In 1987 and 1988, however, U.S. poultry production expanded sharply enough to supply strong growth in both domestic and export markets. The shift in U.S. dietary patterns reflects consumer concern over cholesterol in red meat as a contributor to heart disease, and an increased variety of convenience-type poultry products that can be prepared quickly for consumption. In the next few years, these same forces likely will continue to influence patterns of world trade in poultry meat.

Table 14. World Poultry Meat Exports by Selected Exporters, 1974-78 Average, 1979, 1981, and 1984 through 1988 in Thousands of Metric Tons.

Area	1974-78 Average	1979	1981	1984	1985	1986	Prelim. 1987	Proj. 1988
U.S.	148	228	375	209	211	276	365	318
Brazil	23	81	295	281	274	226	221	201
EC-12[a]	N.A.	271	465	385	346	341	357	343
E. Europe	173	196	289	304	302	320	359	374
Others	33	42	46	77	95	130	129	143
Total[a]	N.A.	818	1,470	1,256	1,228	1,293	1,431	1,379
Total[b]	853	1,156	1,836	1,645	1,657	1,786	1,947	1,916

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83, May 1983; *Dairy, Livestock and Poultry*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; and FL&P 1-87, September 1987.

[a] Excludes intra-EC trade.

[b] Includes intra-EC trade.

Developments in Soviet Agriculture and U.S. Trade Relationships

With large year-to-year fluctuations in its grain production and imports, the Soviet Union is a major influence on the volume of grain traded in world markets and has considerable impact on world grain prices. The extremes in year-to-year changes in its grain production since the early 1970s have ranged from slightly over an 80 million metric ton (3 billion bushel) increase to nearly a 60 million ton (2.3 billion bushel) decrease. As an example of the potentially volatile Soviet role in world markets, approximately one-fourth of the world grain trade and one-third of all U.S. corn exports in 1984-85 were accounted for by Soviet imports. But the next year, its imports accounted for only 17 percent of global grain trade and about one-fifth of all U.S. corn exports. The Soviet Union's significance as a price-influencing factor is caused not only by the size and variability of its imports, but also by its centralized grain purchasing system. Import decisions in the USSR are made by a small group of government officials who can contract for the nation's entire yearly grain import needs in a very short time, if they wish to do so. This centralized purchasing system creates the potential for an ever-present element of surprise in Soviet buying patterns.

The USSR's initial entry into world grain markets in the early 1970s as a large and continuous grain importer was a classic example of this surprise element, with Soviet buyers dealing with several large grain firms, and failing to disclose the total size of their import needs to any one firm or to U.S. Department of Agriculture officials in charge of the wheat export subsidy program. Since that time, grain merchandisers throughout the world have continuously monitored Soviet weather, political developments, and other factors that might reveal purchasing patterns. The importance of this potential surprise element stands out when the USSR purchasing system is contrasted with that of Japan, another large grain importer. Japan's private enterprise system spreads purchasing decisions over a large number of individual decision makers, and the element of potential surprise is much less significant than with the Soviet Union. In addition, Japan's grain import levels are relatively stable from year to year. Consequently, little or no world grain price reaction usually follows Japanese purchase announcements.

1987-88 Soviet Grain Imports Near Previous Year but Well Below Record

In 1987, Soviet grain production at 211 million metric tons was about the same as in the previous year, and was well above the average level of the early 1980s because of favorable weather during the growing season and improved management systems. That kept 1987-88 Soviet grain imports near the level of the previous season, but well below the record in 1984-85. That year, a sizable part of the Soviet Union's grain belt was struck by drought, with grain production dropping to the lowest level in three years and falling 10 percent below the average of the previous nine years. That also was the sixth consecutive year in which Soviet grain production fell sharply below the officially planned level. With a series of poor crops, record or near-record livestock and poultry production, and low grain carryover stocks, Soviet grain imports in 1984-85 jumped to a record 55 million metric tons (July-June trade year), up 23 million metric tons, or 72 percent, from a year earlier. The earlier record grain imports by the Soviet Union had been 46 million metric tons in 1981-82, following an extremely low 151 million metric ton grain harvest. Decreased Soviet imports were the main reason for a decline in world grain trade in 1985-86, with its wheat and coarse grain imports falling that year by 40 and 52 percent, respectively, as its crops recovered from drought.

Early indications are that total Soviet grain production and imports in 1988-89 may be about the same as a year earlier. Its winter wheat crop, which normally accounts for approximately one-third of the country's total grain harvest, reportedly is in much better condition than in 1987, when production was reduced by heavier-than-normal winter kill. Also adding uncertainty to 1988-89 Soviet import requirements is the availability of foreign exchange for grain purchases. Soviet foreign exchange availability for grain imports may be restrained some by its industrial import needs, slower economic growth, and lower world petroleum prices than in the early 1980s. Oil and gas exports are a major source of revenue for the Soviet Union.[12] The resulting decreased availability of foreign exchange as compared with the 1970s and early 1980s may be requiring some reordering of Soviet priorities on

Table 15. Soviet Grain, Soybean, and Soybean Meal Importing Patterns in Millions of Metric Tons, 1975-76 through 1980-81 and 1982-83 through 1987-88.

	1975-76	1976-77	1977-78	1980-81	1982-83	1983-84	1984-85	1985-86	Prelim. 1986-87	Proj. 1987-88
Wheat Imports[a]	10.1	4.6	6.6	16.0	20.8	20.5	28.1	15.7	16.0	21.0
Coarse Grain Imports[a]	15.6	5.7	11.7	18.0	12.5	11.5	26.9	13.7	12.0	10.0
Total Imports, Wheat and Coarse Grains	25.7	10.3	18.3	34.0	33.3	32.0	55.0	29.4	28.0	31.0
Percentage from U.S. Origin[b]	54%	72%	78%	24%	20%	44%	28%	24%	28%	44%
Soybean Imports	1.7	1.5	0.9	1.4	1.1	1.0	0.9	2.0	1.1	1.8
Percentage from U.S. Origin[b]	18%	62%	93%	0%	40%	50%	0%	79%	6%	46%
Soybean Meal Imports	0.0	0.1	0.0	1.0	2.8	0.8	0.6	0.6	2.6	3.2
Percentage from U.S. Origin[b]	0%	100%	0%	0%	0%	0%	0%	0%	0%	41%

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains* FG 23-82, July 16, 1982; FG 10-83, April 12, 1983; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 4-87, April 1987; FG 7-87, July 1987; FG 3-88, March 1988; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-81, March 1981; FOP 9-82, July 1982; FOP 4-83, April 1983; FOP 6-84, June 1984; *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-87, April 1987; FOP 4-88, April 1988; U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; U.S. Department of Agriculture, Agricultural Marketing Service (Independence, Mo.) *Grain Market News and Feed*, various issues; U.S. Department of Agriculture, Foreign Agricultural Service, *U.S. Export Sales*, June 4, 1982, and various issues; and personal communication with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

[a] July-June trade years.

[b] Imports from U.S. origin are on October-September marketing years.

industrial growth, defense, grain versus protein meal imports, and goals regarding increased per capita consumption of livestock and poultry products.

Longer-Term Grain Production Prospects

Figure 26 shows little upward trend in Soviet grain yields since the early 1970s and large year-to-year variability of yields. Future trends in Soviet grain imports will depend heavily on its success in reducing annual yield variability, and in overcoming longstanding difficulties in improving the productivity of its grain sector. Factors contributing to these two problems are complex and include climatic limitations from a grain belt that lies largely on a latitude similar to that of the Canadian prairie provinces. Its climate includes a short growing season, substantial risk of frost and drought damage, and periodic problems from excessive rain or snow during the harvesting and winter wheat planting seasons.

Along with climatic limitations, Soviet agriculture faces serious coordination problems from its state-controlled agricultural system. These problems are evident from reports of a chronic lack of spare parts and disabled machinery during key fieldwork periods; inadequate crop drying, storage, and transportation equipment at harvest; reports of harvesting and planting delays as farm workers wait for instructions on the individual day's activities; lack of the proper type and quantities of fertilizer at the time it is needed; and similar problems with other inputs. With a short growing season, optimum timing and coordination of all operations are essential for an efficient crop production sector.

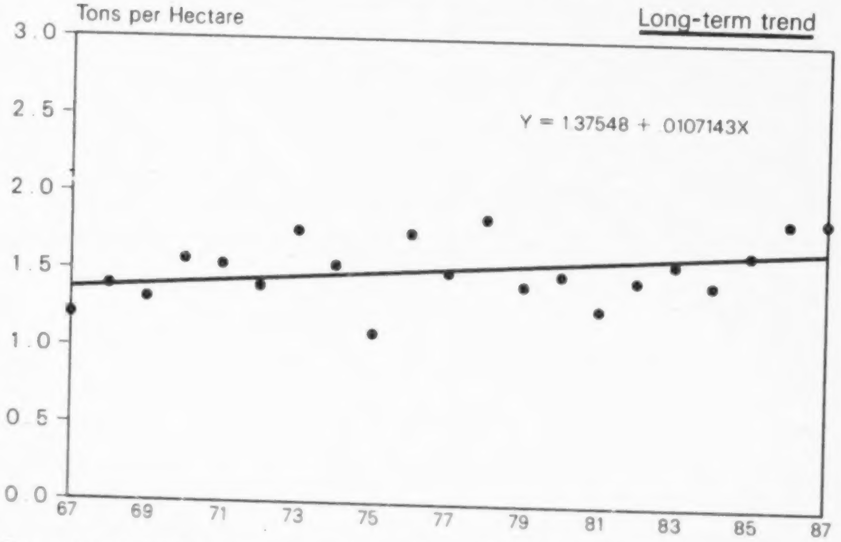
While substantial time likely will be required to achieve improved coordination in the Soviet crop sector, the nation is shifting in that direction. The top Soviet leadership position is now held by a relatively young person trained in agronomy and experienced in USSR agriculture. Massive Soviet grain and oilseed imports have absorbed foreign exchange that otherwise could have been used to improve industrial output, so a strong incentive exists for the USSR to deal with lagging productivity in crop production. According to a U.S. Department of Agriculture publication, the Soviet leader is attempting to streamline and optimize the current agricultural system, rather than make radical changes in the system itself. In the streamlining process, a move is underway to improve labor productivity through a contract system where worker remuneration is linked more closely with output.[13] Some reports also indicate the nation is experimenting with a pilot program of selling shares in state farms to farm workers, with return on the shares dependent on the economic performance of the farm.[14] The Soviet Union also is emphasizing an "Intensive Technology" program involving use of improved varieties and increased use of fertilizers, herbicides, and other inputs. About one-third of its grain area was in the Intensive Technology program in 1987, up from 16 percent two years earlier, according to an International Wheat Council report.[15] That report also stresses a need for increased Soviet grain drying, storage, and handling capacity to cut the excessively high post-harvest losses to benefit from the Intensive Technology production gains.[16]

Other Soviet policies aimed at improving crop production include plans for large investments in a long-term program to drain approximately 20 million hectares of potential cropland by the year 2000, and to extend irrigation to an additional 30 to 32 million hectares.[17] Available investment funds and costs of the projects will determine whether these goals are attained. Other investment plans call for expanded grain storage and handling facilities to reduce spoilage losses, and expanded production of fertilizer and farm machinery.[18] Soviet grain and oilseed yields likely will trend upward in the years ahead. However, the performance record of the last 15 years suggests that changes are likely to be gradual, and that the USSR will likely continue its large and variable pattern of grain imports for the next several years.

Oilseed Prospects

Prospects for Soviet oilseed and/or oilseed products are less clear than those for grain. Official plans call for sharply increased oilseed production, but so far little progress has been made in that direction (see Table 16). Soviet livestock rations contain extremely low protein contents by Western standards. Increased protein meal imports could enable Soviet agriculture to more efficiently use limited grain supplies and also could improve productivity of its livestock and poultry sectors. Accordingly, the current Soviet leadership appears to be placing increased priority on large oilseed and/or protein meal imports. This shift in priority began in mid-1987 with sizable purchases of South American soybeans and meal, and was followed by unusually large purchases of U.S. soybeans and soybean meal in late 1987. In the early 1980s, the Soviets experimented with increased protein meal imports for one year,

Figure 26. Trend in USSR Grain Yields in Metric Tons per Hectare, 1967-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 25-76, October 7, 1976, FG 4-83, February 15, 1983, FG 7-85, May 1985, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 4-87, April 1987, FG 3-88, March 1988.

but allowed imports in following years to decline to previous levels.[19] However, greater knowledge of how to use soybean meal in increasing livestock and poultry feeding efficiency now may be positioning the Soviet Union for further increases in its soybean meal and/or soybean imports in the years ahead.

Livestock Sector

In the USSR livestock sector, aggregate Soviet livestock numbers have expanded slowly since 1985, with preliminary estimates of 1987 total beef, pork, and poultry meat production reaching a record 18.6 million metric tons, 3 percent above a year earlier. Milk and egg production expanded by 1 and 2 percent, respectively.[20] Use of grain in livestock and poultry feed in the USSR has fluctuated in a relatively narrow range in recent years, despite increased meat, egg, and milk production.[21] Thus, feed conversion efficiency of the Soviet livestock sector appears to be trending upward. Further increases in feed conversion efficiency appear likely in the years ahead through animal breeding and genetics, improved animal health and nutrition, better management, and related developments.

Table 16. Soviet Oilseed Production in Millions of Metric Tons, 1972-73 through 1987-88, and Projections for 1988-89.

	Soybeans	Cottonseed	Sunflower
Preliminary			
1987-88	.70	4.44	6.10
1986-87	.70	4.87	5.26
1985-86	.46	4.94	5.23
1984-85	.47	4.74	4.53
1983-84	.56	4.82	5.06
1982-83	.50	5.09	5.34
1981-82	.45	5.28	4.65
1980-81	.53	5.08	4.62
1979-80	.40	4.14	5.41
1978-79	.63	4.67	5.33
1977-78	.54	4.69	5.90
1976-77	.48	4.51	5.28
1975-76	.78	4.81	4.99
1974-75	.36	4.53	6.78
1973-74	.42	4.36	7.39
1972-73	.26	4.09	5.05

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-84, April 1984; FOP 2-84, February 1984; FOP 11-83, November 1983; FOP 9-83, September 1983; FOP 13-82, November 1982; *Foreign Agriculture Circular, World Crop Production*, WCP 4-85, April 1985; WCP 5-86, May 12, 1986; WCP 7-87, July 1987; WCP 12-87, December 1987.

U.S.-USSR Grain Agreement

The expiring U.S.-USSR Grain Trade Agreement went into effect in October 1983 and had a duration of five years ending on September 30, 1988. As of mid-1988, it was expected to be replaced by a new and slightly modified agreement. The expiring agreement required the United States to make available and the USSR to purchase a combined minimum of 9 million metric tons annually of U.S. corn and wheat, divided about equally between corn and wheat. This minimum quantity was up from 6 million tons in the prior agreement. The expiring agreement also allowed 0.5 million metric tons of soybeans or soybean meal to be substituted for 1 million tons of grain, at the discretion of the USSR, in meeting the minimum purchase commitment. In addition, the agreement permitted the USSR to purchase a combined maximum of up to 12 million tons of U.S. wheat and corn without prior consultation with the U.S. government. With consultation, additional purchases beyond the 12 million ton limit were permitted. In the 1984-85 trade year, the U.S. administration offered to make as much as 27 million tons of U.S. corn and wheat available to the USSR. However, actual Soviet purchases of U.S. grain were only about two-thirds that amount. In 1985-86 and 1986-87, Soviet purchases remained below the maximum specified in the agreement. The U.S. administration in 1987-88 gave approval to the Soviet Union to buy whatever quantity of U.S. grain it wanted, and at mid-year it appeared that total purchases would slightly exceed the "maximum" specified in the agreement.

A long-term agreement has been part of the U.S. trade policy with the USSR since the mid-1970s. It was originated in an effort to bring greater stability and predictability to Soviet purchasing patterns. Through most of the period in which the agreements were in effect, both sides honored their minimum commitments for corn and wheat. However, in 1984-85 and 1985-86, the USSR temporarily failed to meet its minimum annual U.S. wheat purchase obligations. As their explanation for doing so, Soviet officials said that U.S. wheat was priced above that of other wheat exporters, and that the U.S. had refused to grant the USSR adequate price concessions through its Export Payment-in-Kind (or Export Enhancement) program. Since that time, large offers of Export Enhancement Program (EEP) wheat were extended to the Soviet Union in 1987 and early 1988, and have resulted in large Soviet purchases of U.S. wheat.

Despite the past problems with wheat sales to the Soviets, the USSR will likely continue as a large importer of U.S. corn in the next few years. Alternative non-U.S. supplies of corn in quantities typically imported by the USSR are more limited than those for wheat. However, Soviet total purchases of U.S. grain probably will continue to vary substantially from year to year, depending on the size of the Soviet grain harvest, the availability of foreign exchange, and political relationships between the two nations.

At this writing, a new long-term U.S.-USSR grain agreement is under negotiation. The agreement is expected to be similar to the one expiring September 30, 1988, except for possible inclusion of additional products such as soybeans, soybean meal, and possibly broilers. Also, the agreement is expected to be more specific about the required competitiveness of U.S. prices versus those for similar products available from non-U.S. suppliers. A wider range of allowable Soviet purchases without consultation with the U.S. may also be included in the agreement.

Financial Developments Affecting U.S. and World Agricultural Trade

Due to slightly more cautious business and consumer spending stemming from the severe decline in international stock markets in October 1987 and high levels of consumer indebtedness, the U.S. economy is expected to experience a gradually slowing rate of growth through 1988 and early 1989. Several private forecasts also show a substantial probability of at least a brief period of recession in the U.S., beginning sometime in 1989 or 1990, due in part to continued large U.S. trade and budget deficits and an unusually long period over which the current expansion has occurred. Since the U.S. has been leading the world economy out of the recession of the early 1980s, slower U.S. economic growth is expected to be a tempering influence on the world economy for the next 6 to 12 months, and possibly longer. Growth rates will continue to differ substantially from one country to another. Continued moderate economic growth is expected in Pacific Rim nations including the Republic of Korea, Japan, Taiwan, Hong Kong, Singapore, and Malaysia. Economies of these countries are expected to be supported by strong exports to the U.S. However, Japanese economic growth may be restrained some by the low value of the U.S. dollar relative to the yen. The weak dollar increases costs of items imported into the U.S. and thus may slow the growth in demand for Japanese industrial products. Recent trends suggest West European economies may experience a relatively slow economic expansion during the next 6 to 12 months, along with slow economic growth in a number of heavily indebted developing nations. In general, these trends point to a possible slowing in the growth rate of U.S. and world export demand for agricultural products for at least the next one to two years, provided weather conditions are favorable in major foreign crop-producing regions.[22]

Key Problem Areas

Global economic prospects for the years immediately ahead are closely related to three problem areas: (1) continued heavy indebtedness of developing nations as well as the U.S. government and many private firms and individuals in developed economies, with accompanying large financial needs for debt servicing; (2) the unstable exchange rate of the U.S. dollar; and (3) the level of real interest rates (nominal interest rate minus inflation rate), which affect debt-servicing costs, economic growth, the availability of consumer funds for food purchases, and agricultural production, processing, storage, and marketing costs.[23] These three problem areas are closely interrelated and stem at least partly from U.S. monetary and fiscal policies. The U.S. fiscal policy with several years of record large federal budget deficits is highly stimulative to the U.S. economy. To offset this and restrain inflationary pressures, a relatively restrictive U.S. monetary policy has been required. These diverging policies have created a strong U.S. government demand for credit, with resulting high domestic real interest rates, even though U.S. real interest rates have declined considerably from record levels of the early 1980s.

Since international investment capital moves freely and quickly from one country to another in search of maximum returns, capital movement into the U.S. has been heavy. The strong foreign demand for U.S. dollars for investment purposes has been a slightly supporting influence on the U.S. currency, although its value against major West European and Pacific Rim currencies declined sharply from early 1985 to early 1988. Foreign capital flows into the United States have assisted in financing the U.S. federal budget deficit. But the recent weaker U.S. dollar has increased the threat of inflationary pressures stemming from imported goods, and may increase the pressures on U.S. monetary authorities to implement more restrictive monetary policies. That in turn would tend to raise interest rates, slow economic growth in the U.S. and abroad, and could worsen debt-servicing problems of developing nations.

Other countries also have adopted more restrictive monetary policies in the 1980s than in the 1970s, in an effort to retard capital outflows to the U.S. Resulting relatively high non-U.S. real interest rates, along with movement of investment capital to the U.S., have tended to hold foreign economic growth well below the unusually strong levels of the 1970s. At the same time, these interest rates have pushed inflation rates in most industrial nations well below the levels of the previous decade.

From time to time in recent years, problems of debt and high real (inflation-adjusted) interest rates have caused uneasiness about the health of the U.S. and world banking systems. This concern comes from heavy involvement of some lending institutions in loans to developing nations that are experiencing difficulty meeting debt-servicing requirements, and also from financial risk-exposure of lending institutions involved in foreign exchange transactions and the stock and bond markets. The global financial system could be placed under severe pressure in case of widespread defaults on developing-nation loans or major losses from financial market transactions. Other concerns about the banking system from time to time stem from debt burdens of private U.S. firms, as well as from investment losses resulting from volatile interest rates. However, developing nations appear to be making gradual progress in reordering their economies to meet debt-servicing requirements. At this writing, that has somewhat diminished the concern over the stability of the international banking system.

Adjustments of Developing Nations to Debt Burdens

The three most heavily indebted developing nations are Brazil, Mexico, and Argentina, along with substantial debt burdens in Eastern Europe and several oil-exporting nations. In Latin America, adjustments to debt burdens have generally involved a four-dimensional approach: (1) reduced government spending, (2) restructuring debts to lengthen repayment periods, (3) reducing nonessential imports, and (4) taking steps to increase exports. After experiencing severely reduced real economic output in the early 1980s, many Latin American countries have experienced slightly positive real economic growth in the last two years.[24] At the same time, however, exports of such countries as Brazil and Argentina are creating increased competition for U.S. agricultural exports. Heavily indebted nations are under strong pressure to restrain imports and increase exports to meet debt-servicing costs. These pressures have been slightly reduced in the past three years by lower interest rates and a resulting decline in debt-servicing costs. Weakness of the dollar and moderate costs for imported energy and other raw materials also have helped to ease debt burdens of oil-importing developing nations.

However, the decline in world petroleum prices from levels of the late 1970s and early 1980s appears likely to remain a major restraint on economic growth of Mexico, Venezuela, Nigeria, the Middle East, and other oil-exporting developing nations. Relatively low energy export price impacts negatively on the debt-servicing ability of these countries, while helping to slightly ease debt problems of oil-importing nations.

Exchange Rate Volatility

From mid-September 1985 to mid-April 1988, the exchange rate of the U.S. dollar declined by approximately 49 percent in terms of the Japanese yen and by 43 and 36 percent, respectively, against the West German mark and French franc. While the dollar weakened against many other currencies, the declines relative to the currencies of Canada, Australia, Korea, and Taiwan were considerably smaller than in terms of the yen and West German mark. The lower exchange rate reflected several developments, including easing of U.S. monetary policy, lower petroleum prices that have tended to benefit West European importers and Japan more than the U.S. because of greater dependence of those nations on oil imports, and coordinated monetary actions by a group of seven industrial nations. The group of seven includes the U.S., United Kingdom, France, West Germany, Canada, Italy, and Japan. These nations have agreed to coordinate monetary and fiscal policies in ways permitting the U.S. dollar to remain well below earlier peak exchange rates relative to currencies of major industrial nations. Coordinated action by the group was triggered at least partly by strong pressures for trade protectionism in the U.S. Congress to shield U.S. industries from low-cost imported products. The strong dollar during the 1981 to early 1985 period had substantially reduced the cost of many products imported into the U.S., and was a contributor to the large and growing U.S. trade deficit. However, substantial time lags are required for the recent weaker U.S. dollar to have a major positive impact on the nation's trade balance through reduced imports and increased exports.

Through mid-1988, the quantity of U.S. agricultural exports showed a positive response to the weaker dollar, along with several other positive influences. A lower exchange rate of the U.S. dollar tends to reduce the cost of U.S. products to foreign buyers, and theoretically should encourage increased exports. However, grain prices to final users in most of Western Europe, the USSR, and Eastern Europe and wheat prices in Japan are largely insulated from exchange rate fluctuations.[25] Thus, the weaker dollar should not be expected to have a major expansionary effect on the demand for U.S. grain in these areas. In addition, U.S. grain exports continued to face significant restraints in 1987-88 from foreign supplies and limited demand growth resulting from a sluggish world livestock economy. Unlike wheat and corn (maize) prices, soybean and soybean meal prices to most foreign users are relatively free of artificial restrictions and are able to reflect exchange rate changes within a relatively short time. Thus, the weaker dollar likely contributed to the increase from a year earlier in September 1987 to May 1988 U.S. soybean exports, despite competition from increased foreign oilseed supplies.

An additional factor limiting the response of U.S. grain exports to the declining dollar exchange rate against West European and Japanese currencies is the continued strong dollar relative to currencies of other grain exporters and many developing nations. For example, while the U.S. dollar fell about 49 percent relative to the yen from mid-September 1985 to mid-April 1988, it declined only 10 percent against the Canadian currency, 9 percent against the Australian dollar, 16 percent against South Korean currency, 29 percent against the Taiwan dollar, 30 percent against the U.K. pound, and rose relative to currencies of Brazil, Argentina, and Pakistan.[26] Also, a declining dollar has reduced the purchasing power of oil-exporting nations since petroleum is priced in U.S. dollars in world markets. In short, the decline in the U.S. dollar's exchange rate has been only a slightly positive factor in U.S. agricultural trade through mid-1988, with a more positive impact on oilseeds than on grains. Export gains in U.S. food and feed grains appear to be more related to crop production short-falls in several major foreign producing regions, U.S. government policies that have held grain prices at low levels, and an aggressive U.S. government export assistance program for wheat and barley, which has sharply lowered the cost of these products to foreign buyers.

Future exchange rate impacts on U.S. agriculture will depend on whether a broader-based decline in the value of the U.S. dollar can be achieved, as well as on the availability of competing farm product supplies in world markets. When supplies of foreign exporters are large, these nations appear likely to offer their products at whatever prices are needed to meet U.S. competition and move supplies into world markets. Over time, modest world prices stemming from U.S. price support, export assistance, and exchange rate policies should encourage increased growth of world grain, oilseed, and meat utilization, and increased agricultural trade. Modest longer-term world prices for grains and the weaker U.S. dollar also may bring slightly reduced utilization of major inputs such as fertilizer and appear to be causing an idling of marginal quality land in some areas, thus tending to restrain the rise in global grain production. However, time lags of at least two to five years may well be involved before the full effect of a sustained lower U.S. dollar is noticed in agricultural trade patterns.

China, India Again Become Net Grain Importers

In 1987-88, China and India re-emerged as large importers of grain after being significant exporters in the previous three years. The reasons behind these shifts are of special importance to the world grain economy, since the countries are the two most heavily populated nations and represent over one-third of the world's population. India's 1987-88 grain imports are due primarily to a severe 1987 drought, while China's appear to be due to combination of adverse weather, government adjustments in grain prices relative to those for other crops, and rapid internal demand growth stemming from expansion of industrial exports and growing consumer incomes. Both nations, from time to time since the early 1970s, have been large importers of U.S. grain, often in response to weather problems. Their shift to sizable importers in 1987-88 has both (1) reduced the foreign competition faced by U.S. grains in Far East markets, and (2) opened additional export opportunities for American grain in these two countries. A key consideration for private and public decision makers is whether this new source of import demand is likely to be temporary, or whether it will continue in future years.

China

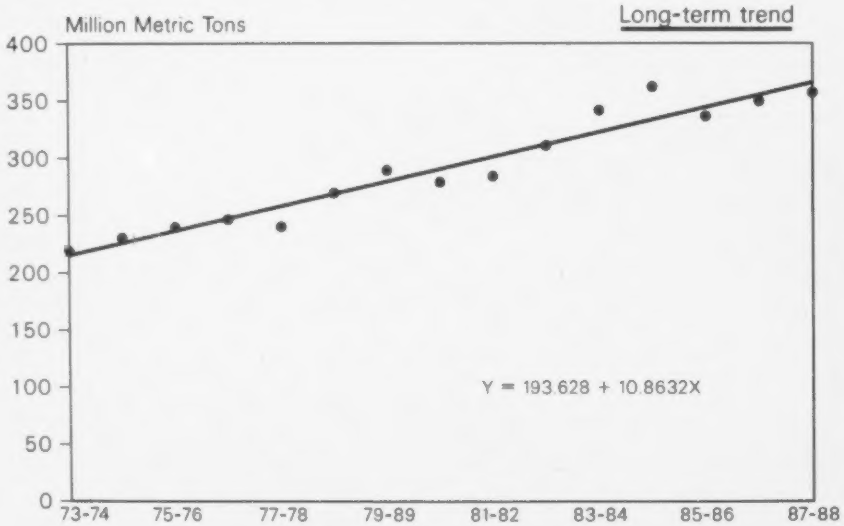
Before its slowdown in 1987, China's grain production had grown at a sharply accelerated rate since the mid-1970s. Accelerated growth was due to the combined effects of increased use of technology and changes in its economic system (see Figure 27). Technological developments included construction of a large number of new fertilizer plants, increased use of fertilizer, expanded irrigation, improved varieties, and changes in government policies to encourage research. In the late 1970s, China also changed its economic system to allow farm workers greater freedom in managing production, and to provide individual economic incentives to farm workers to market excess production in return for cash payments.[27] Increased domestic grain production moved China into a net exporter position in corn and at times in soybeans during the mid-1980s. Its exports competed with U.S. grain and soybeans in Korea, Japan, and the USSR. In 1987-88, China remained a modest net exporter of coarse grains, but its wheat imports increased by an estimated 5 million metric tons, boosting its total wheat imports to 13.5 million metric tons. Reports from China indicate the inability of production to keep pace with growing consumption is due in part to a government decision to lower grain prices relative to those for other crops. That reportedly has caused a shift of cropland from grain to other products.

Future trends in Chinese grain and soybean imports will depend heavily on China's pricing policies as well as its ability to generate further technological improvements in production through expanded agricultural research. Import patterns also will be influenced by trends in urban incomes and food consumption patterns.[28] An expected upward trend in Chinese per capita income and a likely increase in consumption of meat and poultry may limit the expansion of Chinese coarse grain and oilseed exports, and could return that nation to a net importer position in these crops at times in the next few years, even when its crops are good. In addition, China may well be a substantial ongoing importer of wheat in the next few years, with its imports increasing sharply in times of adverse weather and reduced yields.

India

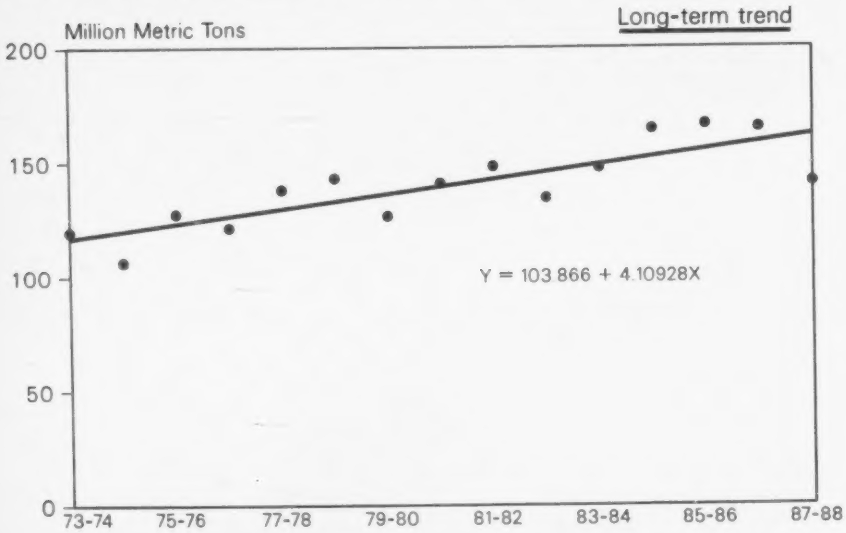
India is the second most populous nation in the world. Its climate is more variable than that of China, partly because Indian grain production is heavily dependent on monsoon rains. Sharply below normal monsoon rains in 1987 sharply reduced India's grain production, causing it to halt exports, draw down carryover stocks, and import wheat and corn. In addition, its imports of vegetable oils in 1987-88 increased sharply from levels of recent years. As shown in Figure 28, before the 1987 drought India had made recent impressive strides in grain production through the use of improved technology. Grain production was increased by higher yielding varieties, expanded use of fertilizer and irrigation, and improved management. The 1987 drought reduced water supplies in irrigation reservoirs and wells and may thus restrain the nation's grain production again in 1988. But unless extended weather problems occur, improved management and technology appear likely to push Indian grain production irregularly higher in the next several years. However, with its population of over 700 million people and variable weather patterns, India will likely alternate from a grain exporting to an importing position from time to time from now through the mid-1990s. During the 1983-84 through 1986-87 period, it was a small exporter of wheat and feed grains while accumulating large carryover stocks.

Figure 27. Trend in Chinese Grain Production, 1973-74 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 6-85, April 1985; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 5-87, April 1987; FG 3-88, March 1988; various other issues; *Foreign Agriculture Circular, World Agriculture Production*, WAP 1-88, January 1988.

Figure 28. Trend in Indian Grain Production, 1973-74 through 1987-88.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 9-76, May 1976; FG 20-78, November 1978; FG 5-80, February 1980; FG 4-81, January 28, 1981; FG 13-82, April 26, 1982; FG 26-83, September 9, 1983; FG 19-83, November 8, 1983; FG 2-85, January 1985; FG 7-85, May 1985; *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 5-87, April 1987; FG 3-88, March 1988; *Foreign Agriculture Circular, World Crop Production*, WCP 4-87, April 1987; *Foreign Agriculture Circular, World Agricultural Production*, WAP 1-88, January 1988.

U.S. Agricultural Exports and Imports Rise in 1987

U.S. agricultural exports reversed their downward trend of the previous six years in the last half of calendar year 1987, rising to a total for the year of $28.6 billion and 133 million tons. U.S. agricultural exports were up 9 percent from the previous year in dollar value and up 22 percent in volume. Declining U.S. exports in dollar value in the previous several years reflected declining prices for most major U.S. agricultural products, as well as sharply reduced physical volumes of U.S. grains being exported. The volume of U.S. exports was reduced during the first half of the decade by increasing supplies available from competing agricultural exporters at competitive prices, increased self-sufficiency of many importing nations, and slower growth in world consumption of farm products than in the 1970s.

In the first half of 1987, foreign supplies of grain and some oilseeds were reduced by severe drought in India, Pakistan, Thailand, and neighboring countries, and parts of Eastern Europe and the Southern Hemisphere. Crop problems in these areas, as well as an improving world economy and aggressive U.S. government export assistance programs, were important factors behind increased U.S. farm product exports in the last one and one-half years. Tentative projections place total U.S. agricultural exports for the October 1987-September 1988 fiscal year at $33.5 billion, moderately above the calendar year 1987 total and 20 percent above a year earlier but 24 percent below the 1980-81 record.

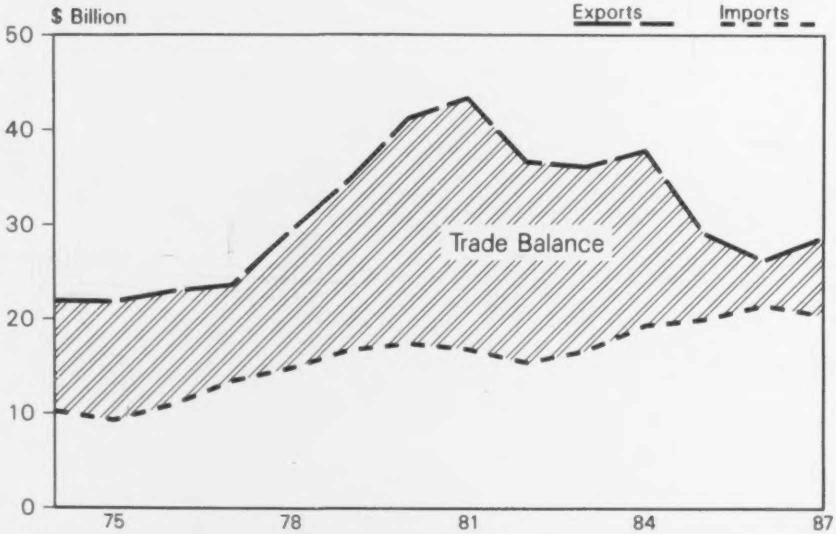
U.S. agricultural imports declined slightly in fiscal 1986-87 for the first time in several years. Preliminary indicators point to another possible decrease in U.S. agricultural imports in 1987-88, partly as a result of the weak dollar, which makes imported products less competitive with domestically produced farm products. The nation's total imports of all agricultural products in fiscal 1986-87 dropped to $20.6 billion, down 1.4 percent from the record 1985-86 level. With imports valued at $20.6 billion and exports at nearly $27.9 billion in fiscal 1986-87, the U.S. net trade surplus in farm products increased to nearly $7.3 billion, about one-third larger than the previous year but less than one-third as large as in 1980-81. Despite the improvement from a year earlier, the net U.S. agricultural trade balance still was the second lowest since the early 1970s, and was accompanied by a slight decrease in the U.S. nonagricultural trade deficit.

While the U.S. agricultural trade balance is improving, its low level is a matter of serious concern to both the agricultural and nonagricultural sectors of the U.S. economy. For the agricultural sector, it means a continuation of some restraint on income and the financial health of production agriculture, as well as restrained demand for inputs such as farm machinery, seed, fertilizer, chemicals, livestock facilities, and equipment. It also means improving but still restrained employment in these and other sectors supplying agriculture, as well as in processing, handling, transporting, and exporting farm products. Restricted income and employment in these areas have a multiplier effect on economic activity in rural communities as farm families restrict expenditures for farm and nonfarm items, with a resulting restraint on agriculturally related employment as well as economic activity in main street businesses of rural communities.

At the national level, the net trade surplus in agriculture traditionally has helped to pay for a substantial part of the nation's imports of nonfarm products. In that way, it has contributed to the economic well being of the U.S. population and also helped to stabilize the exchange rate of the U.S. dollar so that imported items remain reasonable in cost. However, the U.S. nonagricultural trade balance has continued to deteriorate in the last few years and now is so large that the modest trade surplus in agriculture offsets only about 4 percent of the total trade deficit.

The huge deficit in the nonagricultural sector is due partly to major imbalances in U.S. monetary and fiscal policies. Fiscal policies reflect major federal budget deficits, with a need for those deficits to be financed partly through foreign investments in the U.S. That has created a strong demand for U.S. dollars abroad to be recycled back into the U.S. for investment purposes. And with a somewhat restrictive U.S. monetary policy, the financial market and exchange rate mechanisms have caused those dollars to be supplied to foreign investors through large U.S. imports. Nonagricultural U.S. exports in fiscal 1987 totaled $199.9 billion, up 13 percent from the previous year. At the same time, nonagricultural imports rose to $367.4 billion, a 7 percent increase from fiscal 1986. The resulting deficit in nonagricultural U.S. foreign trade of $167.4 billion far outweighed the $7.3 billion agricultural trade surplus. For comparison, the U.S. nonagricultural trade deficit in fiscal 1980 was $53.7 billion, and the U.S. agricultural trade surplus was $23.2 billion.

Figure 29. Dollar Value of U.S. Agricultural Exports and Imports, 1974-87 Calendar Years.

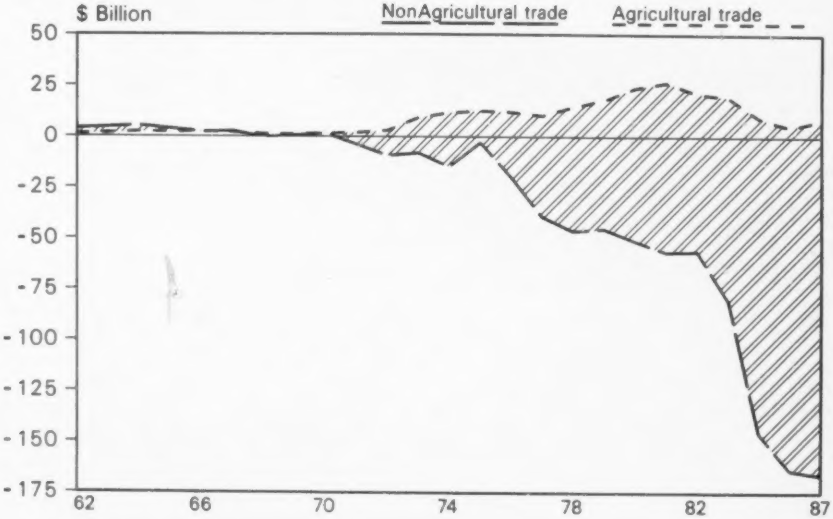


Source: U.S. Department of Agriculture, Economic Research Service. *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues.

The large U.S. trade deficit, if it does not turn downward soon, has important implications for U.S. economic growth and interest rates, as well as the economic health of U.S. agriculture and other sectors heavily dependent on exports and/or sensitive to import competition. Policy tools for dealing with this problem will be discussed in a later section of this report. Preliminary indications point to a continued large but slightly declining U.S. trade deficit in fiscal 1988, along with a continued moderate recovery in the value of U.S. agricultural exports.[29]

The sharp decline in U.S. agricultural exports in the first half of this decade was one of several factors behind continued severe economic pressures in U.S. agriculture and a sharp decline in asset values in the U.S. agricultural sector. For the next several years, given approximately normal weather in major foreign grain-producing areas, new U.S. farm policies should continue to generate some expansion of the nation's farm product exports. However, growth of U.S. agricultural exports seems likely to remain well below the sharp upward trend of the 1970s. Several more years of adjustment appear necessary before Eastern Europe, Latin America, and other developing nations fully recover from current debt problems. Oil-exporting nations also are experiencing some of these same economic adjustments, with reduced availability of funds for farm product imports and expected slower economic growth in the years ahead. Growth rates for U.S. agricultural exports also will depend on future trends in the value of the U.S. dollar. Recent major changes in U.S. policies, with sharply lower price support levels for major crops, and the decline in value of the U.S. dollar should continue to stimulate some growth in the value of U.S. agricultural exports during the next several years. However, some additional time lag will be involved before export growth rates reflect the full benefit of these actions.

Figure 30. Net U.S. Trade Balance in Agricultural and Nonagricultural Products by Calendar Years, 1962-87.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues.

U.S. Government-Assisted Export Programs: PL-480 Continued, Export Enhancement Program (EEP) Expanded Sharply

In contrast to the 1970s when U.S. government agricultural export assistance programs were small, official programs to encourage expanded agricultural exports have increased greatly in size in the last few years with the lower level of U.S. commercial sales. For example, about two-thirds of the 1987-88 U.S. wheat exports have been made under the Export Enhancement Program (EEP). The U.S. export assistance programs have their origins as far back as the 1920s and in the Agricultural Development and Assistance Act of 1954 (Public Law 480). Originally they were intended to: (1) assist in disposal of surplus U.S. agricultural commodities, (2) help countries lacking foreign exchange to purchase U.S. agricultural products, and (3) facilitate U.S. foreign aid efforts.[30] In the last 15 years, similar programs have been developed by Western Europe and Japan. And since the beginning of this decade, emphasis in U.S. programs has increasingly shifted toward: (1) meeting price competition from heavily subsidized products of other nations, (2) assisting nations that are unable to obtain commercial financing, (3) providing more attractive financing arrangements than are commercially available in order to compete with financing terms and/or price advantages offered by other exporting nations, and (4) reducing world hunger.

Concessional Export Assistance Programs

The U.S. has three main types of concessional export programs for agricultural products: Title I and Title II of PL-480 and Agency for International Development (AID) programs. The PL-480 Title I program provides long-term, low-interest U.S. government credit with repayment terms of up to 40 years and a grace period of up to 10 years. Repayments are to be made in U.S. dollars or other currencies readily convertible into dollars. U.S. statutes require three-fourths of all food aid exports under Title I to be sent to countries with a per capita Gross National Product (GNP) of $730 or less per year.[31] Prior to fiscal year 1982, the GNP requirement had been $680 per year. Title II of the PL-480 program involves food donations for export, with about two-thirds normally shipped by voluntary relief agencies. In past years, India was a major recipient of Title II agricultural exports. That nation accounted for slightly over one-fifth of such shipments in fiscal year 1981-82.[32] With increased self-sufficiency in grain and oilseeds, PL-480 shipments to India declined in the 1982-87 period. However, they increased in 1988 in response to that country's severe 1987 drought. The AID program was begun in 1979 to provide financial grants and loans for agricultural commodity purchases. After its inception, strong emphasis for such financing was first given to Israel and later extended to Egypt and Sudan.[33] Table 17 shows the distribution of U.S. farm product exports under concessional programs by commodities in recent years. These programs have been oriented heavily toward soybean oil, wheat, flour, and nonfat dry milk.

Non-Concessional Export Assistance Programs[34]

In recent years, the U.S. administration and Congress have given substantial emphasis to U.S. government loan guarantees and other non-concessional export assistance programs. By the 1983-84 fiscal year, about one-eighth of the total dollar value of U.S. agricultural exports was accounted for by combined shipments under such programs and PL-480 programs, in an effort to halt the downward trend of U.S. agricultural exports. In the last two fiscal years, over 90 percent of U.S. wheat exports moved under some type of government export assistance program.

The two main types of non-concessional U.S. export assistance programs are the EEP and Commodity Credit Corporation (CCC) loan guarantees. The EEP is an export payment-in-kind program in which commercial exporting firms use government certificates to acquire CCC (government-owned) commodity inventories. Government commodities then are added to commercially purchased commodities, with the resulting net price to the foreign buyer being below the price for non-export assisted U.S. products. The EEP has been used extensively for wheat, to meet heavily subsidized exports from the EC. It also has been used to a smaller extent for barley, sorghum, and vegetable oils. The EEP has been targeted heavily toward the USSR, North Africa, the Middle East, Eastern Europe, and China. The program was developed and mandated by Congress in the Food Security Act of 1985. Program regulations provide the flexibility to permit EEP bonus payments in another commodity other than the one being sold commercially, if CCC inventories of that commodity are low.

CCC loan guarantees (GSM 101 and 102 funds) also are an important part of the non-concessional export assistance programs. These funds are used to assist exporting firms in making sales to foreign buyers who have difficulty obtaining commercial credit. With CCC loan guarantees, private lending institutions provide short-term or intermediate-term credit for purchases of U.S. farm products. The CCC, a U.S. government agency, guarantees repayment of the loans and a sizable part of the interest. U.S. Department of Agriculture officials indicate the repayment history on CCC guaranteed loans generally has been good. However, one exception is Poland. CCC has found it necessary to make some payments on loans to that nation in the past few years because of its severe financial problems. Major destinations under the CCC credit guarantee programs have been Latin America, the Middle East, South Korea, and Eastern Europe, in that order. Wheat, feed grains, and oilseed products have been the major commodities involved.

Table 17. U.S. Concessional Government Agricultural Exports as Percent of Total Exports by Major Commodities, Fiscal Years 1977, 1979, and 1983 through 1987.

Commodity	1977	1979	1983	1984	1985	1986	1987
Wheat and flour	17.5	13.0	10.6	8.6	14.9	18.0	14.0
Corn	2.5	3.7	2.3	2.4	2.0	2.1	2.1
Soybean oil	22.0	17.3	29.3	27.8	39.6	35.4	76.3
Cotton (exc. linters)	1.2	1.0	0.6	0.5	0.5	0.9	1.5
Milk, nonfat dry	99.8	83.4	8.7	18.8	72.0	41.8	50.3
Others	4.2	2.6	0.8	1.4	2.9	1.8	2.1

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues.

Cargo Preference Change and Concessional Export Programs

In the Food Security Act of 1985, the U.S. Congress modified the cargo preference requirement by increasing the required percentage of commodities to be shipped under concessional export programs (those under PL-480 and AID programs) in U.S. flag ships to [illegible] percent. The percentage U.S. flag ship requirement is known as cargo preference. Before this change, the cargo preference requirement had been 50 percent. The increase was spread over a three-year period, with a 10 percent increase in both 1986 and 1987, and a 5 percent increase in 1988. Shipments of grain under the EEP were specifically excluded from the cargo preference requirements.[35] These changes and a Congressional requirement that the U.S. government use at least $1 billion in government-owned commodities for EEP during 1986 through 1988 have led to an extremely sharp increase in government assistance for several U.S. agricultural commodity exports, especially wheat, barley, and sorghum.[36] Cargo preference legislation is used to help ensure that the U.S. maintains a viable merchant marine fleet for national defense purposes. In recent years, freight rates of U.S. vessels have been as much as $.40 to $.80 per bushel above comparable rates for foreign vessels, with the exact differential depending on vessel size, shipping route, destination, and other variables.

U.S. Agricultural Trade Trends by Commodity Groups

As shown in Figure 31 and Table 18, the total dollar value of U.S. agricultural exports rose modestly in the 1986-87 fiscal year. Total agricultural exports were valued at $27.9 billion, 6 percent above the previous year, but well below the 1980-81 level. Increases in value were especially pronounced in 1986-87 in animal products, poultry, fruits, vegetables and nuts, and cotton. Grain export volumes were up but values were down because of lower prices. The quantity of U.S. feed grain exports in 1986-87 increased 31 percent from the low level of the previous fiscal year, while total values of the nation's feed grain exports declined by 1.9 percent. U.S. wheat and wheat product exports were up 11 percent in volume but down 12 percent in value while cotton exports were up 109 percent in value and up 171 percent in volume. Exports of oilseeds and oilseed products increased only slightly in value for the year.

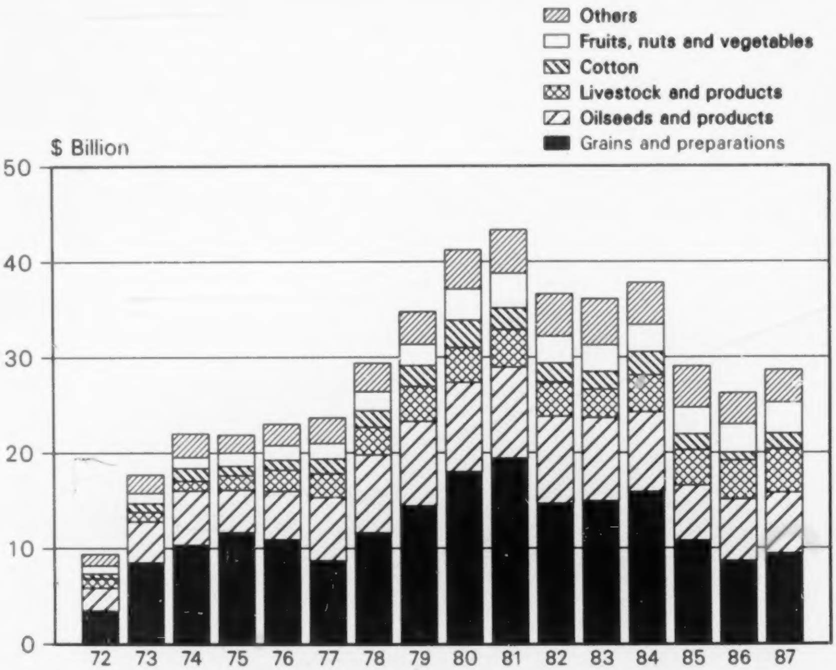
Composition of U.S. Agricultural Exports

Grain and oilseed exports, as indicated in Figure 31, accounted for a large part of the growth in value of U.S. agricultural exports from 1972 through 1981. These same products also accounted for much of the drop in value of exports from 1981 to 1986, declining by 55 percent in value during this period. Livestock and poultry exports now make up about 18 percent of all U.S. agricultural exports in dollar value. The value of these exports as a group in 1986-87 was 22 percent larger than six years earlier, while cotton exports were about one-third smaller in value than six years earlier. The value of fruit and vegetable exports dropped moderately in the past six years, with the value now lower than in 1980-81 despite a modest recovery in value in the past year. Grains, feeds, oilseeds, and oilseed products together had accounted for approximately two-thirds of the value of U.S. agricultural exports in recent years, but their share dropped to about one-half in 1986-87. Exports of grains and cotton are increasing in volume and value in fiscal 1987-88 in response to changing U.S. government programs, although total values are expected to remain well below earlier peak levels.

U.S. Agricultural Imports

In previous issues of this report, it has been noted that sustained trading relationships require a two-way exchange between trading partners. If the United States is to export products and services to other

Figure 31. Value of U.S. Agricultural Exports by Commodity, 1972-87 Calendar Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues. Livestock excluding poultry and dairy products.

Table 18. Value of U.S. Agricultural Exports by Type of Commodity, 1976-77, 1980-81, 1985-86, and 1986-87 in Billions of Dollars.

Commodity Group	October-September Fiscal Years 1976-77	1980-81	1985-86	1986-87	Percentage of 1986-87 Total Exports
Feed grains	5.39	10.40	3.75	3.68	13.2
Oilseeds	4.64	6.98	4.39	4.41	15.8
Oilseed meal	0.97	1.67	1.13	1.35	4.8
Vegetable oils	0.77	1.10	0.75	0.54	1.9
Wheat and wheat products	3.05	8.05	3.55	3.12	11.2
Rice	0.69	1.54	0.65	0.55	2.0
Meat and meat products	0.61	0.99	1.01	1.30	4.6
Hides and skins	0.80	1.00	1.44	1.67	6.0
Dairy products	0.17	0.24	0.43	0.49	1.8
Poultry and poultry products	0.30	0.77	0.46	0.60	2.2
Other animals and animal products	0.77	1.11	1.01	0.95	3.4
Cotton	1.54	2.23	0.68	1.42	5.1
Fruits, vegetables, and nuts	2.45	3.56	2.91	3.41	12.2
Tobacco	1.08	1.34	1.32	1.20	4.3
Others	0.78	1.63	2.82	3.18	11.4
Total	24.01	42.61	26.30	27.87	99.9

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1982; and November 1977.

countries, it must also be willing to import from those countries in order to maintain a lasting trading relationship. Products Americans buy from other countries generate earnings that those countries can use to purchase U.S. exports. In this process, trading partners usually export products that can be produced more efficiently at home. These same trading partners also tend to import products that can be produced more economically by their trading partners. Through this process, participants on both sides of the trading transaction can increase their standards of living over levels that would otherwise exist and can carry on a substantial trading relationship over an extended period of time.[37] Because of this principle of comparative advantage, the U.S. imports a sizable volume of certain agricultural commodities.

Table 19 shows the composition of the value of U.S. agricultural imports in 1986-87 and comparisons with recent years. One-third of the value of all U.S. agricultural imports is represented by products not produced commercially in the United States or produced only in very limited quantities because of climatic limitations. These products are classified as complementary imports because they do not compete directly with domestic production. Included in this category are coffee, tea, rubber, cocoa, drugs, and bananas and other tropical fruits. The largest single commodity in dollar value in this group, coffee, accounted for 48 percent of the value of all complementary imports in fiscal 1986-87. Total U.S. imports of complementary agricultural products in fiscal 1986-87 declined by 13 percent in value from the previous year, with the decrease largely reflecting lower prices for coffee. Supplementary agricultural product imports increased by 6 percent in value in the 1986-87 fiscal year, with increases in the value of beef, pork, poultry, dairy products, and fruit imports and decreases in the value of imports of vegetables, sugar, and oilseeds and oilseed products.

Supplementary imports are those products that compete with domestic production. As shown in Table 19, the three largest supplementary import groups are: (1) fruits, nuts, vegetables, and associated products; (2) meat and meat products; and (3) alcoholic beverages. Despite a restrictive U.S. sugar import policy and sharply declining sugar imports, U.S. sugar and sugar product imports are still a sizable supplementary import group. Meat and meat product imports in 1986-87 accounted for about 14 percent of the dollar value of all U.S. agricultural imports. Alcoholic beverages and tobacco imports together accounted for approximately 12 percent of the total, along with 14 percent for fruits, nuts, vegetables, and preparations. While the United States is a large net exporter of oilseeds, oilseed products, grains, and feeds, it also imports small quantities of these products. With the exception of palm oil and coconut oil, these imports usually originate in Canada and represent marketings from elevators, processors, and farmers located near the U.S. border. In the same way, modest quantities of U.S. products sometimes flow across the U.S. border into Canada, although the strong U.S. dollar relative to the Canadian dollar in recent years has discouraged this and, instead, has encouraged increased U.S. imports of Canadian products. U.S. imports of palm oil originate largely in Malaysia, with the volume varying, depending on the price advantage relative to soybean oil. U.S. coconut oil imports typically come from the Philippines.

Figure 32 shows the trend in U.S. imports of agricultural products by major commodity groups since the mid-1970s. The value of sugar imports has dropped sharply since the early 1980s because of lower prices and technological developments in corn

Table 19. Value of U.S. Agricultural Imports in 1975-76, 1984-85, 1985-86, and 1986-87 October-September Fiscal Years by Commodity Groups in Billions of Dollars.

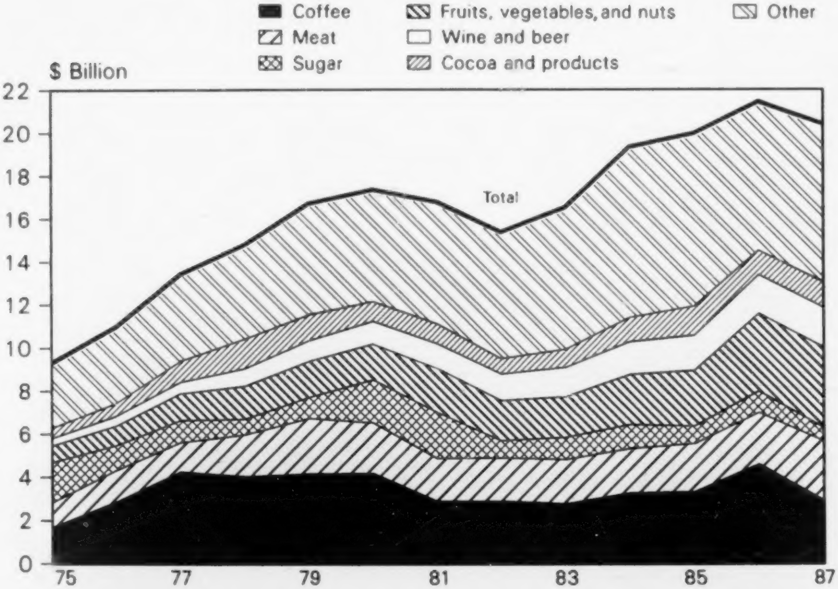
Product	1975-76	1984-85	1985-86	1986-87	Percent Change 1975-76 to 1986-87
Complementary Imports:					
Cocoa and chocolate	0.60	1.29	1.19	1.09	+82
Coffee	2.39	3.24	4.40	3.23	+35
Rubber	0.47	0.68	0.61	0.71	+52
Tea	0.09	0.18	0.14	0.11	+22
Bananas and plantains	0.26	0.75	0.74	0.82	+215
Drugs	0.11	0.20	0.18	0.20	+82
Others	0.28	0.43	0.54	0.62	+121
Total complementary imports	4.21	6.78	7.80	6.78	+61
Supplementary Imports:					
Dairy products	0.26	0.76	0.79	0.85	+227
Hides and skins	0.20	0.24	0.20	0.30	+50
Meat and meat products, excluding poultry	1.44	2.21	2.25	2.80	+94
Poultry and poultry products, excluding eggs	0.09	0.08	0.09	0.10	+11
Other animal products and animals	0.33	0.86	0.96	1.00	+203
Total animals and animal products	2.31	4.15	4.28	5.05	+119
Fruits, nuts, vegetables, and products	0.88	2.49	2.80	2.87	+226
Sugar and products	1.35	1.28	1.00	0.76	−44
Alcoholic beverages	0.43	1.55	1.78	1.80	+319
Oilseeds and products	0.54	0.78	0.64	0.58	+7
Grains, grain products, and feed	0.23	0.60	0.67	0.73	+217
Tobacco	0.28	0.56	0.61	0.63	+125
Others	0.30	1.55	1.30	1.44	+380
Total supplementary imports	6.31	12.96	13.07	13.86	+120
Total agricultural imports[a]	10.51	19.74	20.88	20.64	+96

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1986; November-December 1985; and November 1977.

[a] Totals may not add due to rounding.

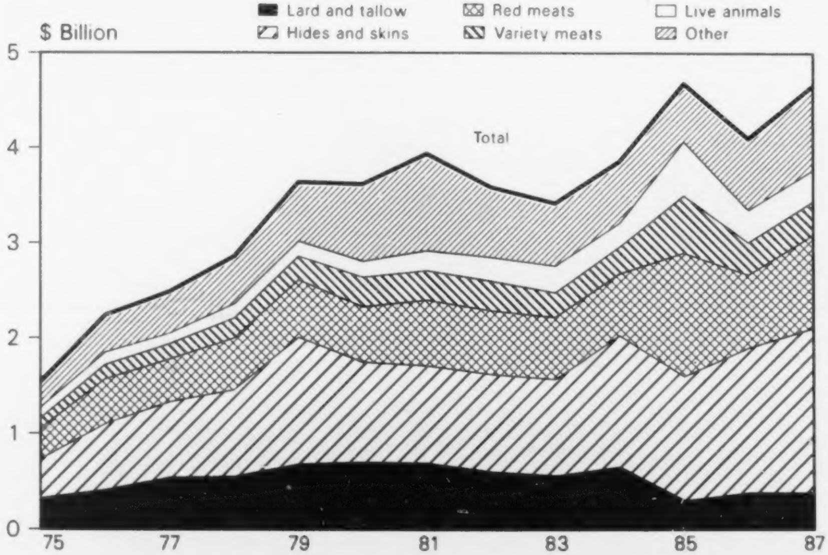
processing that have brought sharply increased use of high-fructose corn sweeteners in U.S. soft drinks and processed foods as a substitute for sugar. U.S. exports of livestock products and imports of red meat are shown in Figures 33 and 34.

Figure 32. Value of U.S. Agricultural Imports by Commodity, 1975-87 Calendar Years.



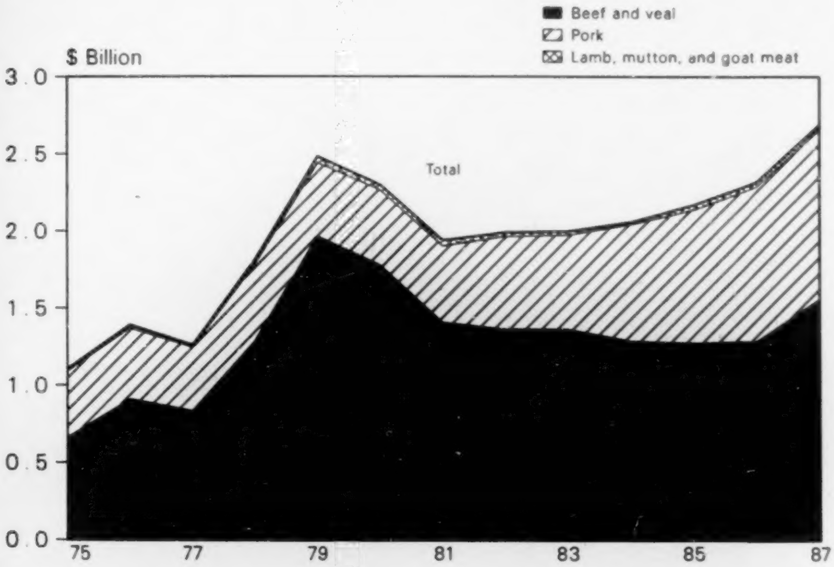
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues. Note: fruits, vegetables, and nuts include bananas. Other includes dairy products, oilseeds and products, rubber, and other imports.

Figure 33. Value of U.S. Livestock Product Exports by Type of Product, 1975-87 Calendar Years.



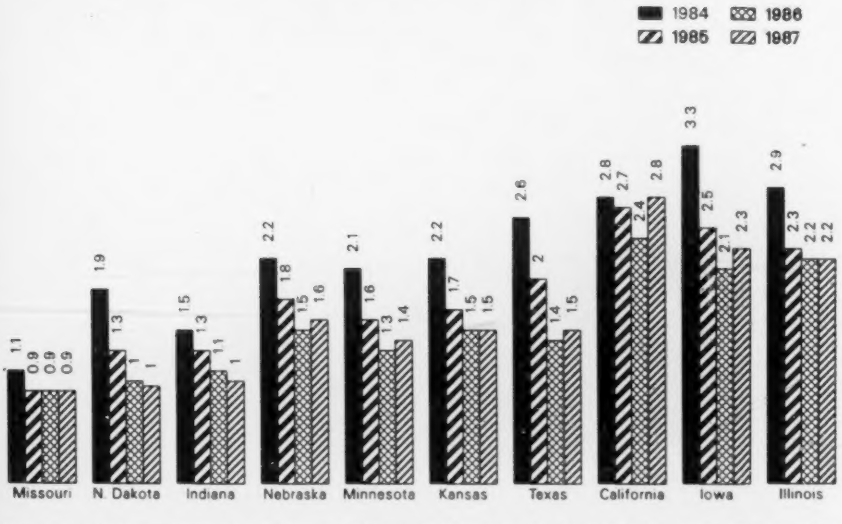
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues. Poultry exports are included in the "other" category.

Figure 34. Value of U.S. Red Meat Imports by Type of Product, 1975-87 Calendar Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; various other issues.

Figure 35. Value of U.S. Agricultural Exports by Selected States in Billions of Dollars, Fiscal Years 1983-84 through 1986-87.



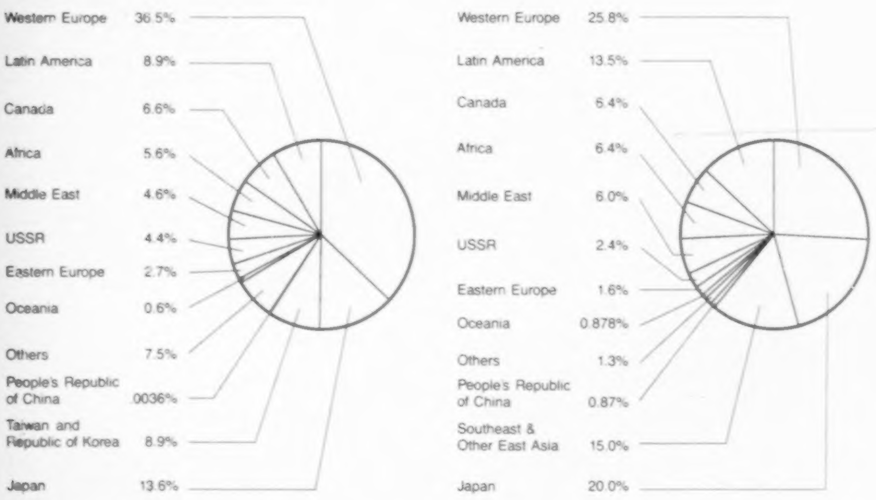
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, March-April 1988; various other issues; and personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

U.S. Agricultural Exports by Leading States and by Economic Groupings of Destinations

The value of U.S. farm product exports by the 10 leading states for the past three fiscal years is shown in Figure 35. The top four exporting states are California, Iowa, Illinois, and Nebraska, in that order, with most other top-ranking exporting states located in major grain-producing areas of the Midwest. Illinois, Iowa, and Nebraska are large exporters of coarse grains, soybeans, soybean products, and livestock. California reflects greater diversity in exports including fruits, vegetables, cotton, and nuts, as well as grain and livestock products. The relative ranking of the top 10 agricultural exporting states has changed slightly in the past six years, and occasionally shifts slightly from year to year depending on the size of crops in individual states.

Figures 36 through 38 show total U.S. agricultural exports, as well as wheat and corn exports, by geographic destinations now and in the mid-1970s. Western Europe declined sharply in importance as a market for these products in the early 1980s, while Japan and less-developed countries have grown in importance as a market for U.S. corn. For combined exports of all U.S. farm products, major growth areas since the early 1970s include Latin America, Southeast and East Asia, and Japan, along with moderate growth in exports to Africa. U.S. agricultural exports to Eastern Europe declined moderately in the last decade.

Figure 36. U.S. Agricultural Export Percentage Shares in Value to Selected Destinations, 1976-77 and 1986-87 Fiscal Years.

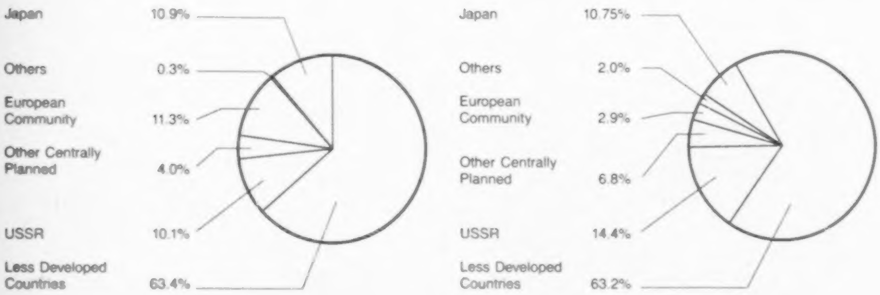


Fiscal Year 1976-77

Fiscal Year 1986-87

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987, and Fiscal Year 1987 Supplement; and personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

Figure 37. U.S. Wheat Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1986-87.



Fiscal Year 1975-76

Fiscal Year 1986-87

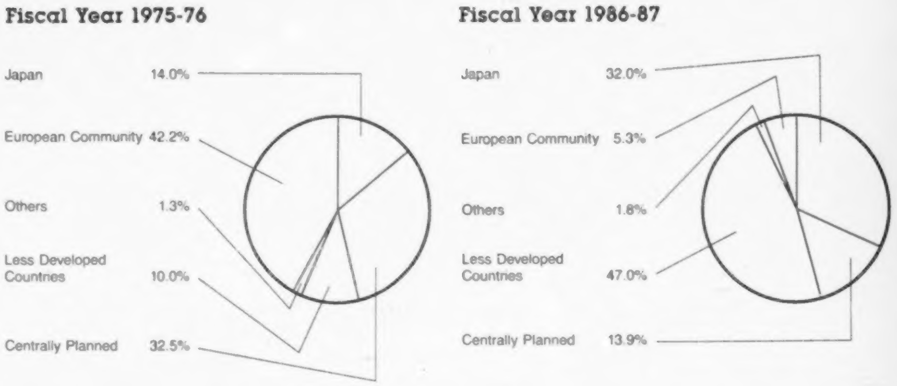
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 37-82, December 8, 1982; Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987. Less developed countries include rapidly and moderately developing nations (excluding Greece) and other developing nations.

Trends in U.S. Corn and Coarse Grain Exports by Destination

Figures 39 and 40 show a dramatic change in the level and destination of U.S. corn and coarse grain exports since the late 1970s. During most of the past two decades, the industrial economies of Western Europe and Japan represented the largest foreign outlets for these U.S. grains. Since 1979-80, however, the once-large EC market for U.S. corn has dropped sharply in size along with a modest decline in exports to other West European nations. Even the traditionally stable Japanese and Republic of Korea markets also have declined slightly in size as competitors have taken steps to export to these nations. China, after being a market outlet for U.S. corn from 1975-76 through 1982-83, dropped its purchases of U.S. corn to zero from 1983-84 through 1985-86 and, in fact, became a corn exporter. While China is importing some U.S. corn in 1987-88, it also continues to export some corn and is expected to remain a net corn exporter for the marketing year. Chinese exports were an important factor behind declining U.S. corn and coarse grain exports to the Republic of Korea and Japan in the early to mid-1980s, although diminished Chinese competition helped to increase U.S. corn exports to these nations in 1987-88.

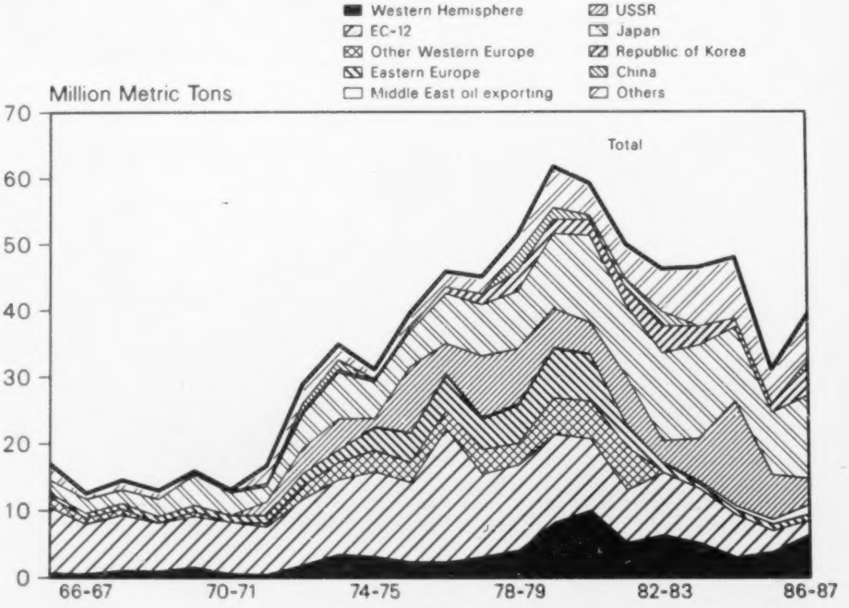
Partially offsetting these trends has been an increased importance of Latin America as a market for U.S. corn, along with modest growth in exports to Eastern Europe. The most dramatic change in U.S. corn and coarse grain exports, however, was the extremely sharp decrease in USSR purchases in 1985-86 and a continued low level of purchases in the following two years. Imports of U.S. corn by the Soviet Union in these years have been less than half the record 1984-85 level. Preliminary data suggest USSR 1987-88 imports of U.S. corn may be about the same as last season. The Soviet Union accounted for about one-third of all U.S. corn exports in the 1984-85 marketing year ending September 30, 1985, and one-sixth in the next three years. The sudden upsurge in Soviet purchases of U.S. corn in 1984-85 reflected that nation's serious 1984 crop problems due to widespread drought, along with record livestock inventories early in the season. The decline in its 1985-86 through 1987-88 imports reflected substantially improved crops in 1985, 1986, and 1987, due at least partly to improved weather.

Figure 38. U.S. Corn Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 37-82, December 1982; Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987. Less developed countries include rapidly and moderately developing nations (excluding Greece, Spain and Portugal) and other developing nations.

Figure 39. U.S. Corn Exports by Destination, October-September 1965-66 through 1986-87.[a]



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987.

[a] From 1982-83 on, the EC is EC-12.

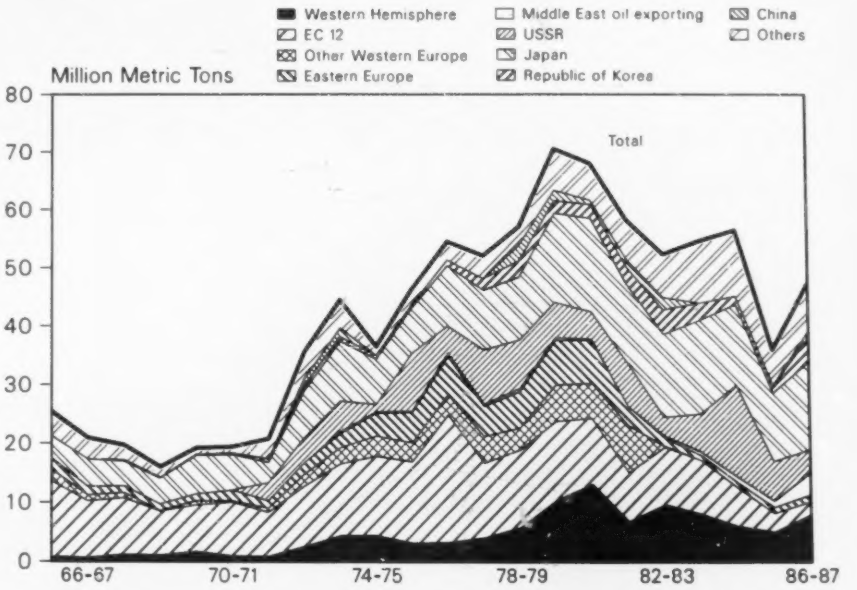
Preliminary data show moderately increased total U.S. corn and coarse grain exports in 1987-88. Several developments, including changing U.S. farm programs and stability or modest additional weakness in the American dollar, appear to be setting the stage for modest additional growth in U.S. corn and coarse grain exports in the 1990s. However in 1988-89, drought-reduced U.S. production and higher prices may temporarily reduce U.S. coarse grain exports. For the early 1990s, global debt problems, foreign competition, and slower world economic growth appear likely to hold export growth rates during this period well below those of the 1970s.

Trends in U.S. Soybean and Soybean Product Exports by Destination

For more than two decades, the industrial economies of Western Europe and Japan have been the major foreign outlets for U.S. soybeans and soybean meal, with soybean meal being an important input for livestock and poultry production (see Figures 41 and 42). U.S. soybean oil exports, on the other hand, are shipped primarily to developing nations where they are used for direct human consumption as cooking oils (see Figure 43). Until 1982-83, U.S. soybean and soybean meal exports exhibited a strong upward trend driven by growing consumer demand for livestock and poultry products and limited growth of competing protein meals.

Growth in foreign demand for U.S. soybeans and meal during the past two decades was greatest in the European Community, which until recently accounted for approximately two-thirds of all U.S. soybean meal exports and approximately half of U.S. soybean exports. Growth in the EC market during the 1970s was encouraged by rising consumer incomes, high domestic EC support prices for grain, a weak U.S. dollar, and an absence of EC import restrictions on soybeans and soybean meal. The EC's Common Agricultural Policy (CAP) maintained internal grain prices well above world levels, and a complex price support mechanism automatically adjusted its grain prices for changes in the exchange rate of the U.S. dollar, as it affected grain import costs. In contrast, soybean and meal imports enter the EC at world price levels, with the weak U.S. dollar further enhancing soybean meal's attractiveness as a feed ingredient. The combination of EC support prices for coarse grains sharply above the world levels, and EC soybean meal priced at world levels, created a soybean meal/corn

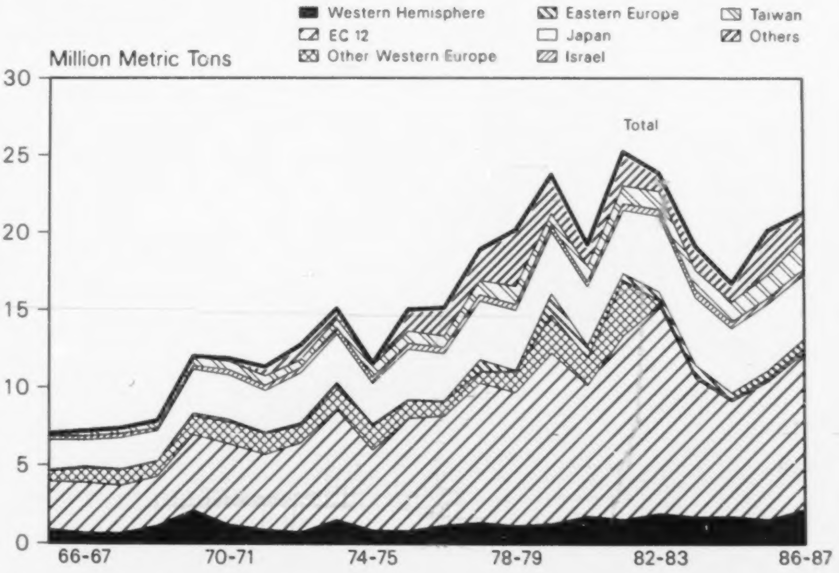
Figure 40. U.S. Coarse Grain Exports by Destination, October-September 1965-66 through 1986-87.[a]



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues, and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987.

[a]From 1982-83 on, the EC is EC-12.

Figure 41. U.S. Soybean Exports by Destination, October-September 1965-66 through 1986-87.



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987.

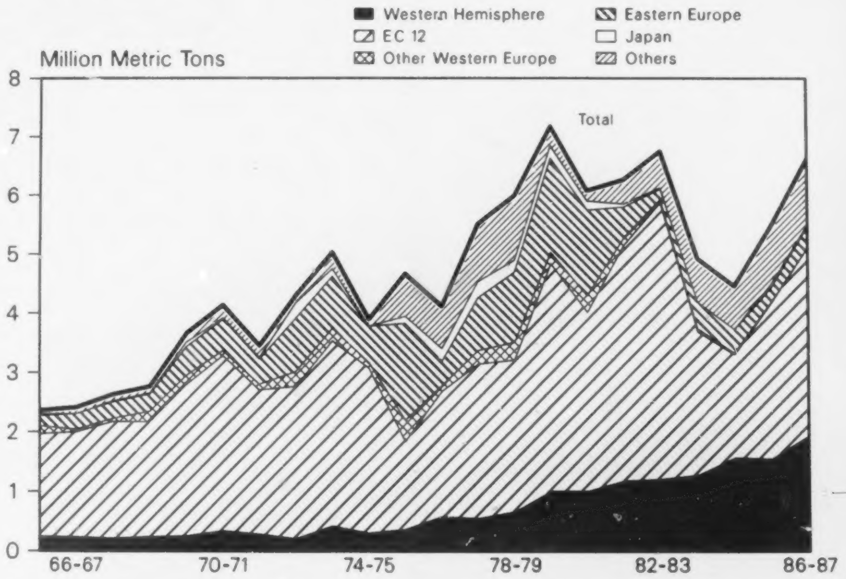
price ratio in the EC much more favorable for soybean meal feeding than in the U.S. and most other nations. As a result, soybean meal in the EC was fed both as a protein source and as an energy source or grain substitute.[38] In years when world grain and soybean prices rise sharply, the relatively steady EC internal grain prices and rising soybean meal prices tend to reduce EC soybean and soybean meal imports and soybean meal feeding substantially, as in 1983-84.

Other contributing factors behind the sharply lower EC purchases of U.S. soybeans and meal earlier this decade included: (1) a sluggish general economy with slower growth in EC incomes than in the 1970s and high unemployment, (2) a dairy surplus reduction program that sharply reduced manufacturing dairy feed sales in 1984-85,[39] (3) sharply expanded EC wheat feeding, and (4) large imports of U.S. corn gluten feed and meal as a substitute for soybean meal. Wheat has a higher protein content than corn, which it has replaced in livestock and poultry rations, thus reducing soybean meal requirements. Corn gluten feed and meal are by-products of the rapidly growing U.S. corn sweeteners and alcohol fuels industry, with around 3.5 million metric tons of these products being exported to the EC in the last four years.[40] U.S. soybean meal exports to the EC in 1986-87 totaled 3.2 million metric tons, down from about 3.9 million tons in 1979-80.

Rising U.S. soybean and soybean meal exports since 1985-86 reflect slightly accelerated economic growth in a number of foreign countries. Additional factors include an improvement in economic conditions in the West European livestock sector and the weaker U.S. dollar.

U.S. soybean and soybean meal exports in the years immediately ahead will depend on the exchange rate of the U.S. dollar, as well as EC livestock and dairy policies and world economic growth. The strengthening dollar in the early 1980s created a price shock in EC meal markets similar to that from a short U.S. crop. With a recent sharp weakening of the U.S. dollar, further modest growth in U.S. bean and meal exports to the EC seems likely in the next few years,[41] along with potential growth in exports to Eastern Europe and the USSR. However, growth rates appear likely to remain well below those of the 1970s because of slower growth in the world economy, continued debt problems in developing nations including Eastern Europe, increased foreign oilseed production, and increased EC

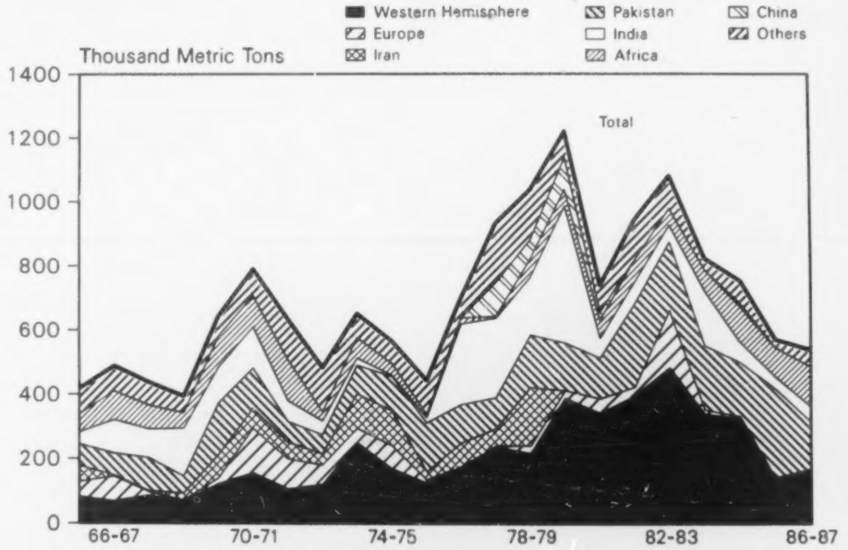
Figure 42. U.S. Soybean Meal Exports by Destination, October-September 1965-66 through 1986-87.[a]



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; Foreign Agricultural Service, *Foreign Agricultural Circular, Oilseeds and Products*, FOP 11-86, November 1986, U.S. export sales April 3, 1986 and April 2, 1987; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

[a] From 1983-84 on, the EC is EC-12.

Figure 43. U.S. Soybean Oil Exports by Destination, October-September 1965-66 through 1986-87.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseed and Products*, various issues, U.S. export sales April 3, 1986, and April 2, 1987; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

wheat feeding stemming from technological improvements in production of that grain.

In contrast to U.S. soybean meal and soybean exports, major foreign markets for soybean oil consist primarily of developing nations in Asia, Africa, and Latin America. As Figure 43 indicates, U.S. soybean oil exports have been highly variable from year to year for more than two decades. Short-term fluctuations in exports are due largely to changes in production of major competing foreign vegetable oils, animal fats, marine oils, and changes in U.S. soybean oil supplies and prices. The export demand for U.S. soybean oil is highly price inelastic. In other words, large changes in prices are needed to bring significant increases or decreases in exports, provided all other market influences remain unchanged. For example, U.S. soybean oil exports dropped sharply in 1983-84, not because of reduced demand, but primarily due to drought-reduced U.S. soybean supplies, limited availability of U.S. soybean oil for export, a sharp rise in soybean oil prices, and the rationing effect on exports resulting from the higher prices. To bring about the required sharp decline in U.S. exports, soybean oil prices in late 1983 and early 1984 rose more than 50 percent above the average level of previous years. The strong dollar and debt burdens of developing nations were other factors tending to reduce 1983-84 soybean oil exports. However, with a high percentage of U.S. soybean oil exports being shipped under government financing programs, these factors appear to have been less significant than in grain and soybean exports.

Exports of U.S. soybean oil in the first half of the 1987-88 fiscal year were well above the previous season's severely depressed level, but at an annual rate less than half the peak level of 1979-80. Exports to India remained sharply below previous peak levels despite its drought-reduced 1987 oilseed crops. U.S. soybean oil sales to India were restrained at least in part by strong competition from Malaysian palm oil. U.S. soybean oil exports to Pakistan and Africa in the first half of 1987-88 also increased from a year earlier, along with increases in exports to most other destinations. World palm oil production has been somewhat variable from year to year, depending on weather conditions in major producing areas. The long-term upward trend in Malaysian production was temporarily interrupted in late 1986 and early 1987, before turning upward later in 1987 and early 1988.

An abrupt change in the global soybean oil situation occurred in 1985-86 and continued into 1987-88. With substantially increased U.S. soybean and Malaysian palm oil production, global soybean and vegetable oil stocks rose sharply and were still at relatively high levels in mid-1988. Rising stocks pushed soybean oil prices sharply below average levels of the previous six years. Early indications are that world soybean oil supplies will tighten substantially in the year ahead, and may bring a substantial reduction in global stocks along with increased soybean oil prices.

In examining prospects for U.S. soybean oil exports for the late 1980s and early 1990s, Figure 43 shows a modest long-term upward trend in exports until the early 1980s, despite large year-to-year fluctuations. Since then, U.S. exports have trended lower in the face of growing competition. The basic growth in demand for vegetable oil reflects an annual population growth of over 2 percent in most developing nations. In addition, per capita fat and oil consumption in these countries is moderately sensitive to changes in per capita incomes. The long-term upward trend of population and incomes in developing countries appears likely to push U.S. soybean oil exports irregularly higher in the years ahead, but with growth restrained somewhat by expanded production of palm and rapeseed oil. In contrast to developing nations, per capita fat and oil consumption in industrialized nations already is large and is expected to increase only slowly. Thus, developing countries are likely to remain the leading export markets for U.S. soybean oil in the years ahead. Since soybean oil competes with a wide range of other fats and oils, large year-to-year fluctuations in U.S. soybean oil exports also are likely to continue in the foreseeable future, due to fluctuations in weather and production of competing products.

Major products that compete with soybean oil include butter, lard, tallow, sunflowerseed oil, cottonseed oil, rapeseed oil, peanut (groundnut) oil, palm oil, coconut oil, safflower oil, olive oil, and fish oil. In contrast to many competing oilseeds, soybeans have a relatively low oil yield (18 percent) and a relatively high protein meal yield (80 percent). Long-term global demand for soybean meal has grown more rapidly than the demand for soybean oil, partly because of strong dietary shifts toward more meat and poultry consumption as incomes rise in rapidly and moderately developing economies. This has generated long-term growth in demand for livestock and poultry feed ingredients, and relatively slower growth in demand for fats and oils. In addition, soybeans have faced strong competition from rapid growth in production of several high-oil content oilseeds.

In the years ahead, indications are that competition from palm oil production and exports will increase significantly, and will continue to restrain long-term growth of U.S. soybean oil exports. Tree plantings in major producing regions of Malaysia have been expanded sharply in recent years and may continue to expand through the remainder of this decade. In addition, improved management practices have the potential to increase palm oil production per hectare in the years ahead.

These forces, from the viewpoint of the U.S. soybean industry, suggest a need for continued priority on market development for soybean oil in developing nations, as well as development of new products from soybean oil.

U.S. Wheat Exports by Destination

Figure 44 shows substantial changes in destinations of U.S. wheat exports since the late 1970s. The most pronounced changes in 1986-87 and 1987-88 were an abrupt increase in USSR and Chinese purchases of U.S. wheat after low levels of purchases or absence from the U.S. market the previous two years. U.S. wheat exports to the Middle East also have increased sharply in the last two years, reflecting heavy targeting of the U.S. Export Enhancement Program (EEP) to several countries in that area. Reduced European imports since the early 1980s reflect increased wheat production in that area. While Western Europe is now a net exporter of wheat, much of its crop consists of soft wheat varieties. The U.S. continues to export some hard wheat and durum wheat to Western Europe to meet specific needs for these wheats.

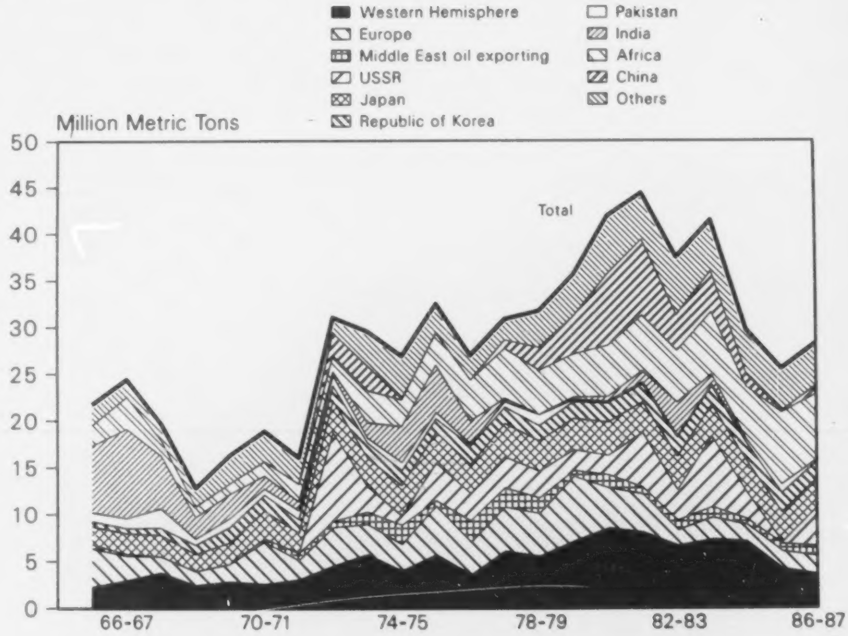
In addition to these trends, U.S. wheat exports to Latin American nations continued a long-run upward trend until 1987-88. The Western Hemisphere and Africa together accounted for slightly over half of all U.S. wheat exports in the 1986-87 marketing year, but their share of U.S. wheat exports fell to only about one-third in 1987-88. Exports to India dropped to zero in 1985-86 and 1986-87 as a result of that nation's increased domestic production, large carryover stocks, and its internal pressure to export wheat. However, severe Indian drought in 1987 shifted that country to an importer of U.S. wheat in 1987-88.

Longer-term trends in U.S. wheat exports will depend on how aggressively the EEP is used. The program was begun in mid-1985 and has been used aggressively since then. Other influences on future U.S. wheat exports will include foreign production trends, continued global population growth, and expected modest world economic growth. The EEP is intended to meet subsidized competition from other wheat exporters, but may be given reduced emphasis for the next year because of drought-reduced U.S. wheat supplies. Depending on foreign weather and production responses of other exporters to higher world wheat prices, the EEP may set the stage for at least slight additional growth in U.S. wheat exports in the early 1990s. However, technological developments in wheat production in India, China, and the EC appear to be nonreversible and will likely generate significant competition in world wheat export markets in the next few years, provided weather is favorable. Foreign supplies may be moderated slightly by shifts in EC government programs. Increased price uncertainty stemming from U.S. farm programs may also encourage some reduction in fertilizer application rates on wheat in non-EC countries, and in that way may tend to slow the upward trend in wheat yields in the next few years.

Figure 44 also shows large year-to-year variations in U.S. wheat exports during the past two decades. This variability is likely to continue in future years and will contribute to significant year-to-year changes in U.S. and world wheat prices. Variability of U.S. exports is related partly to fluctuating production in four important areas: India, China, the USSR, and Australia. The first three are populous nations with a history of substantial variations in rainfall and temperatures from one year to the next. Their import requirements are inversely related to the size of domestic production.

Australia has a highly variable climate, is sparsely populated, and is a major exporter of wheat. When Australia's weather is favorable for wheat production, the U.S. tends to face increased competition in world wheat markets. In contrast to the U.S., Australia and other wheat exporting nations do not have a policy of accumulating reserve stocks when production is large. As a result, the U.S. often is left as a residual supplier to world markets. When world supplies are large and world prices are low, the U.S. traditionally has accumulated reserve stocks to support prices. Conversely, when world grain supplies are reduced, U.S. policies have encouraged these reserve stocks to be utilized to fill the supply gap resulting from reduced foreign crops, as in 1987-88. With the dramatic changes in U.S. price support and reserve policies spelled out in the Food Security Act of 1985, the U.S. role as a residual supplier and holder of reserve stocks may be somewhat diminished in future years.

Figure 44. U.S. Wheat Exports by Destination, October-September 1965-66 through 1986-87.



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987.

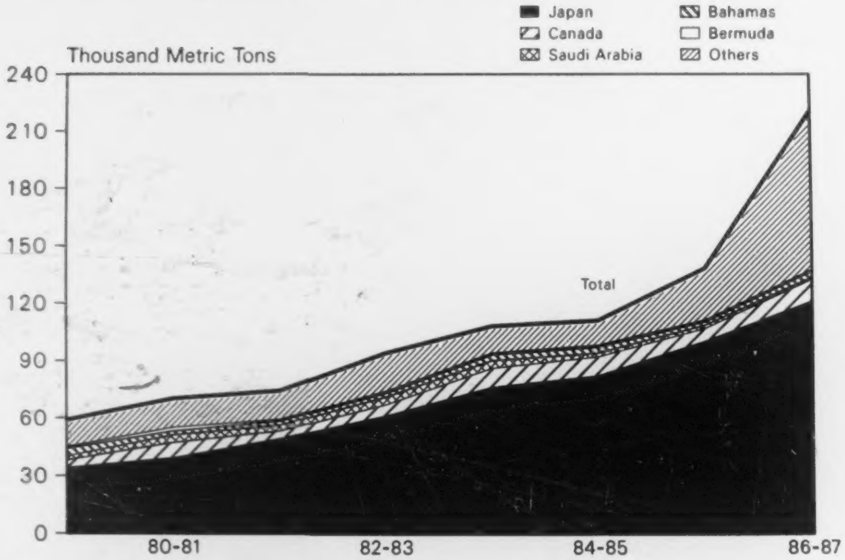
Trends in U.S. Red Meat and Poultry Exports by Destination

The major export markets for U.S. beef are Japan and Canada, and more recently Brazil and the EC. Japan now accounts for well over half of all U.S. beef exports (see Figure 45). The Japanese market for U.S. beef has grown substantially since the mid-1970s, partly in response to pressures from the U.S. government for Japan to ease its import restrictions. U.S. beef exports to Brazil increased sharply in 1986-87 due to shipments of beef from the U.S. government dairy-herd buy-out program, which was designed to curtail surplus mild production. On a tonnage basis, total U.S. beef exports now are nearly three and three-fourths times as large as in 1977-78, with much of the growth due to the increased Japanese purchases.

Future growth in U.S. beef exports will depend heavily on trade negotiations to ease import barriers in Japan and other nations. The U.S. government is continuing to strongly press Japan to reduce its beef import barriers. While some easing of other Japanese restrictions has occurred, major changes in foreign nations' beef importing policies should not be expected in the near future. Foreign beef producers are extremely sensitive to changes in import policies that would increase supplies and depress prices for their products. And in Japan, as well as in several other beef importing nations, agricultural producers have substantial political influence. Thus, resistance of foreign producers to easing of trade barriers will likely continue as a restraining influence on the growth of U.S. beef exports, although some further growth appears likely in the years ahead.

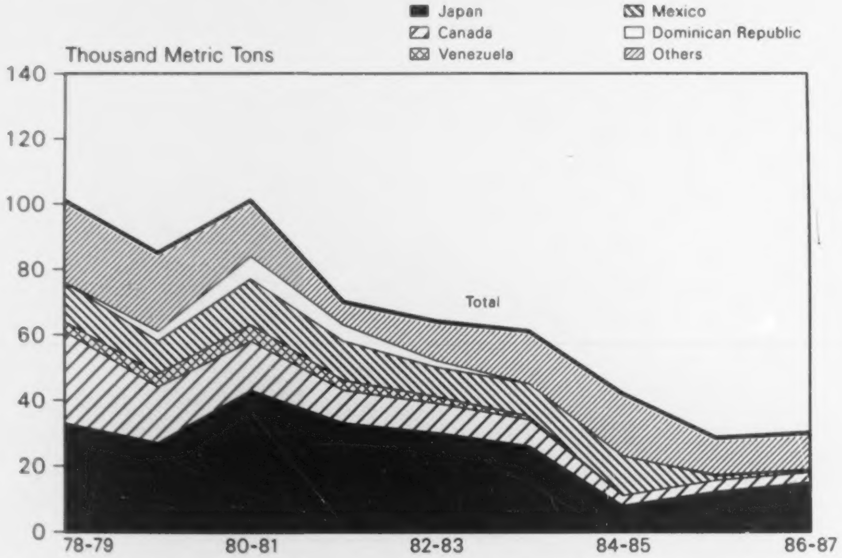
Major destinations for U.S. pork exports include Japan, Mexico, and Canada, as shown in Figure 46. Pork exports from the U.S. to Canada have been in a major downtrend since the late 1970s, partly as a result of the strong U.S. dollar relative to the Canadian currency, which discourages U.S. exports. With declining exports to Mexico and Canada, U.S. pork exports in 1986-87 were only about one-fourth as large as a decade earlier. Declining U.S. pork exports also reflect the slow growth of the world economy and strong competition from pork exporting nations in Western and Eastern Europe. With declining exports since the mid-1970s, future U.S. pork export prospects are uncertain. However, a weaker U.S. dollar and world economic growth may help to stabilize or slightly increase export demand for U.S. pork in the late 1980s and early 1990s, especially in Far East markets.

Figure 45. U.S. Beef and Veal Exports by Major Destinations, 1979-80 through 1986-87 October-September Fiscal Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; various other issues.

Figure 46. U.S. Pork Exports by Major Destinations, 1978-79 through 1986-87 October-September Fiscal Years.



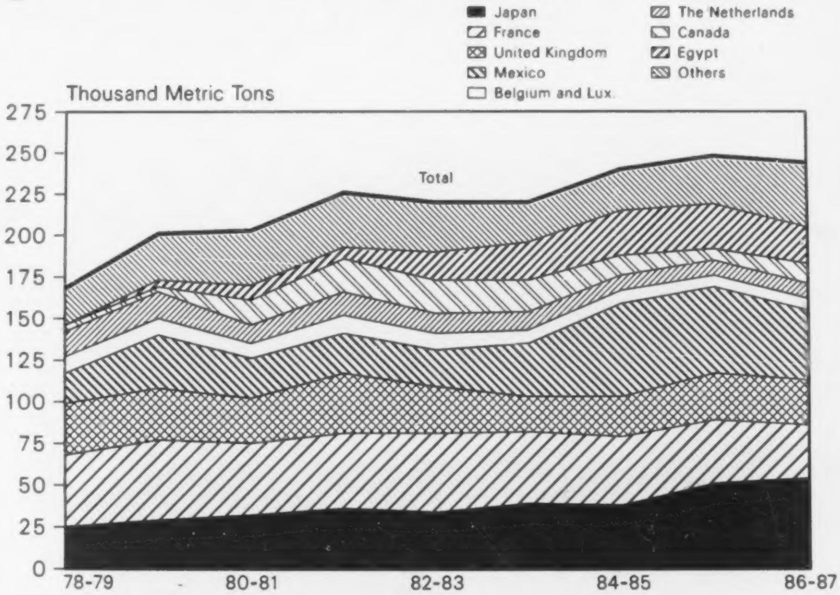
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement, various other issues.

In contrast to pork exports, edible offals and variety meats have exhibited a slight upward trend since the mid-1970s (see Figure 47). Major destinations for exports of these products include Japan, Western European nations, Mexico, Canada, and Egypt. In the last several years, Egypt has emerged as a significant new growth market for U.S. edible offals and variety meats. By 1986-87, it accounted for 9 percent of all U.S. exports of these products and ranked fifth in size of purchases, behind Japan, Mexico, France, and the United Kingdom.

U.S. poultry meat exports were in a sharp downward trend earlier this decade, as shown in Figure 48. However, exports of these products in fiscal 1986-87 had recovered to approximately the record 1980-81 volume. Declining poultry meat exports in the early 1980s reflected subsidized competition from the EC and Brazil, as well as adverse effects from the strong U.S. dollar during the 1981-85 period and sluggish world economic growth. Much of the earlier decline was accounted for by reduced exports to Iraq, Egypt, Mexico, Venezuela, and several countries in the "Others" category in Figure 47.

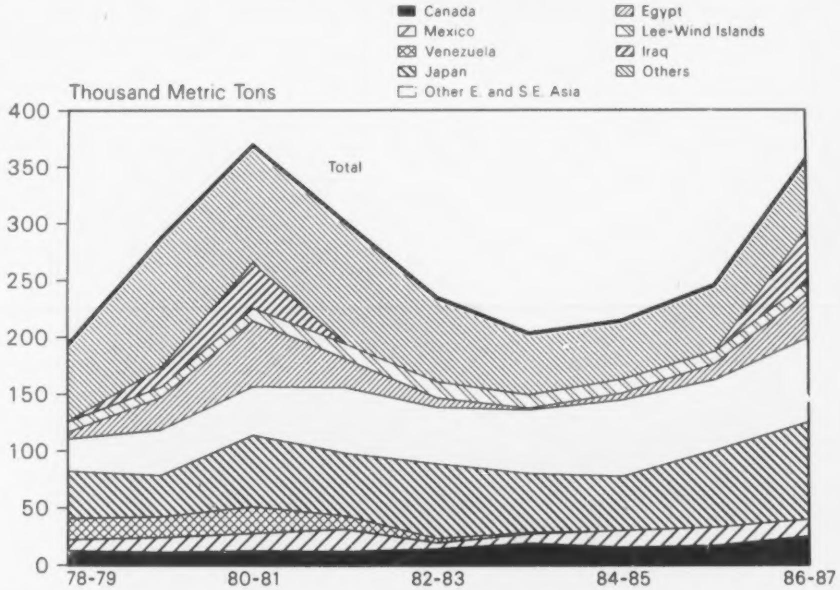
Growth in U.S. poultry meat exports to southeast and eastern Asian markets including Japan has been substantial in the last few years. Expanded U.S. poultry meat exports in 1986-87 were concentrated largely in shipments to Japan, Canada, the Middle East, North Africa, and the Caribbean area, due to economic growth in these nations. Increased quantities exported pushed the value of 1986-87 U.S. poultry meat exports 44 percent above a year earlier. The future of U.S. poultry meat exports will depend heavily on the exchange rate of the U.S. dollar and the strength and timing of changes in world economic growth.

Figure 47. U.S. Exports of Edible Offals and Variety Meats by Major Destinations, 1978-79 through 1986-87 October-September Fiscal Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; various other issues.

Figure 48. U.S. Fresh and Frozen Chicken and Turkey Exports by Major Destinations, 1978-79 through 1986-87 October-September Fiscal Years.



Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; various other issues.

U.S. Price and Income Support Levels Continue to Decline[42]

U.S. price and income support levels for major crops continued to decline in 1987 and 1988, in response to administrative authority provided in current farm laws. Current support mechanisms grew out of a six-month debate in 1985 on ways to improve the U.S. agricultural position in world markets, with the U.S. Congress in December 1985 passing complex farm legislation. That legislation allowed sharply lower price support levels on major crops beginning in 1986, with additional declines in government price support levels permitted through 1990 at the discretion of the U.S. Secretary of Agriculture. The legislation, known as the Food Security Act of 1985, continues a two-fold approach for income support to U.S. producers of major crops. Target prices are a key element of this support system. They are used to determine the amount of deficiency payments or direct payments to farmers participating in acreage reduction programs if market prices during a specified time period are below target levels. Target prices for major U.S. crops were frozen at 1984-85 levels ($3.03 per bushel for corn, $4.38 for wheat) through the 1987-88 marketing year, but have been slightly reduced for 1988-89 ($2.93 per bushel for corn, $4.23 for wheat) and are scheduled to decline moderately to the end of the decade.

The other major component of the U.S. price support system is the loan rates. The price support loan program dates back more than 50 years to the origin of U.S. price support systems in the depression years of the 1930s. Farmers participating in government land-idling programs (except for soybeans, where no land-idling programs are in effect) may store their crops beyond harvest and receive a government loan at the designated loan rate per bushel. These loans have a nine-month maturity. At any time during this period, the farmer may repay the loan plus accumulated interest and sell or use the grain. An alternative often used when cash prices are below the loan rate is for the farmer to deliver the grain (or other crops) to the government in fulfillment of the loan. In this case, principal and interest on the loan need not be repaid. This process is know as forfeiture of price support loans and is the primary mechanism that increases grain stocks owned by the Commodity Credit Corporation (CCC), an agency of the U.S. government. Loan rates vary from county to county across the U.S., due to differences in transportation costs from local producing areas to major export markets. There are thousands of counties in the U.S., each of which has a local office to administer price support programs. For example, Iowa—the leading corn producing state in the U.S.—has 99 counties and corn loan rates that vary by approximately $.18 to $.19 per bushel from the highest to the lowest level.

Corn Loan Rates Down

The Food Security Act of 1985 provides much more discretionary authority to the Secretary of Agriculture in setting crop loan rates than in the past. For example, the 1988-crop U.S. average loan rate for corn was set at a statutory minimum level of $2.21 per bushel, down from $2.55 on the 1985 crop. However, the agriculture secretary is permitted to reduce the statutory levels by as much as 20 percent if the U.S. average price received by farmers in the previous year was not more than 110 percent of the loan rate. This adjustment was made for the 1986 through 1988 corn loan rates since market prices for the previous year's crops were depressed. The agriculture secretary chose to set the 1986, 1987, and 1988 loan rates at the lowest allowable level. As a result, the effective 1988 national average corn loan rate is $1.77 per bushel, down $.78 per bushel ($30.73 per metric ton), or 31 percent, from the 1985-crop loan rate.

Under current U.S. laws, the statutory loan rate for the 1989- and 1990-corn crops will be 75 to 85 percent of the immediately preceding five-year average price received by farmers, excluding high and low years, and with a provision that the statutory loan rates cannot be reduced more than 5 percent from the preceding crop year in any one year. These adjustments could reduce the nominal loan rate for U.S. corn to as low as $1.57 per bushel ($61.86 per metric ton) in 1990, provided world grain prices do not maintain mid-1988's sharp increases from levels of the 1986 to early 1988 period.[43] In addition, the effective loan rate for 1988 through 1990 crops could be reduced from the nominal level by still-to-be-determined amounts resulting from the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Reduction Act.

Even more flexibility in U.S. price support levels is provided by authorization of the Secretary of Agriculture to use marketing loans or loan deficiency payments if necessary to compete effectively in world markets. Marketing loans would allow producers to repay their price support loans at the higher of either the market price or 70 percent of their loan rate if market prices are below the loan. Loan deficiency payments would provide direct cash payments to producers to compensate for cash prices that are below the loan rate, if the producer chooses to forego use of the government loan program. Payment-in-Commodity (PIC) certificates provided by the 1985 Food Security Act were used in 1986-87 and early 1987-88 as a tool to permit market prices for corn and sorghum to drop below government loan rates and encourage utilization. This tool also has enhanced the U.S. competitive position in world markets. PIC certificates allow farmers to repay price support loans at substantially less than the government loan rate at times when world market prices are depressed.

These policy tools, if used in the next few years, will keep the effective U.S. price support levels well below the average of the 1979-85 period. They are a signal that the U.S. Congress is serious about maintaining increased competitiveness of U.S. agricultural exports. Implementation of these drastic changes in U.S. support mechanisms has had far-reaching implications for farmers in other grain exporting nations, grain exporting firms, other international agribusiness industries, and costs of government agricultural programs in the U.S. and other nations. The U.S. price support programs traditionally have provided support to world prices, with foreign exporters often tending to price their products slightly below U.S. levels if necessary to clear the market and avoid increased carryover stocks. The Food Security Act of 1985 indicates other exporting nations must share the burden of matching market-available supplies with effective demand, or pay a penalty in the form of potentially depressed prices resulting as the U.S. deviates from its traditional role as residual supplier.

Loan Rates for Other Crops Also Lowered

Loan rates for other grains are established through formulas similar to those for corn. For example, the nominal U.S. average loan rate for 1988-crop wheat was reduced to $2.21 per bushel ($81.33 per metric ton), down $1.09 per bushel from the 1985 level. The 1990 nominal U.S. wheat loan rate could decline to as low as $2.00 per bushel ($73.60 per metric ton).[44] The effective loan rate could, under certain conditions, be reduced even more through cuts mandated by the Gramm-Rudman-Hollings balanced budget legislation, or by implementation of marketing loans or loan deficiency payments.

The 1986 and 1987 average soybean loan rates were lowered to $4.77 per bushel, down from $5.02 in 1985. For 1988 through 1990 crops, the soybean loan rate is scheduled to be 75 percent of the immediately preceding five-year average price received by farmers, excluding the high and low years, with a $4.50 per bushel minimum level and a constraint that the loan rate for any individual year may not be reduced more than 5 percent from the previous year.[45]

U.S. Target Prices to Decline in 1988-90

While loan rates are the main price support mechanism in U.S. farm programs for most major crops, income support for producers is linked more directly to target prices. For 1988-crop corn, producers participating in the government acreage control program will be eligible for deficiency payments to make up some or all of the difference between the target price and the market price, if prices received by farmers are below the target price. Maximum potential deficiency payments for this year's corn crop were $1.16 per bushel, the difference between the loan rate of $1.77 per bushel and the target price of $2.93. With season average market prices above the loan rate, participating farmers would be paid only the difference between the market price and the target price. Participating farmers would receive the maximum deficiency payment rate on normal production on area planted to corn if the average U.S. farm market price for the September 1988-August 1989 corn marketing year were at or below the $1.77 loan rate. Part of any payments will be made in cash and part in PIC certificates. In addition, payments on the first $.72 per bushel of the corn deficiency payment ($2.93 target price minus $2.21 statutory loan) are subject to a $50,000 payment limit per farmer to avoid unduly large benefits to large farms. These payments are available only to farmers who idle at least 20 percent of their historical corn area, so they are both an income support and a payment for idling land. Corn target prices by 1990 are scheduled to decline to $2.75 per bushel ($108.35 per metric ton).

For wheat, the target price of $4.38 per bushel for the 1988 crop provides maximum wheat deficiency payments of $2.02 per bushel ($74.34 per metric ton). As with corn and other feed grains, a $50,000 payment limitation applies per farmer, with some exceptions. The target price for wheat is scheduled to drop to $4.00 per bushel ($147.20 per metric ton) for the 1990 crop. At this writing, U.S. soybeans have no target prices and consequently no direct government payments are available for production of soybeans.[46]

Supply Control Provisions

For half a century, the U.S. has taken on most or all of the role of supply management in world grain markets in times of surplus production. The Food Security Act of 1985 provides for a continuation of that role if sharply lower price support levels fail to generate enough additional domestic and export demand to reduce carryover stocks substantially. For corn and other feed grains, producers are required to idle from 12.5 to 20 percent of their feed grain base acreage to obtain program benefits, if U.S. old-crop corn carryover stocks are over 2.0 billion bushels (50.8 million metric tons). With carryover stocks at or below 2.0 billion bushels, not more than 12.5 percent of an individual farm's feed grain base area would need to be idled to qualify for program benefits. For wheat, land-idling requirements for participation range from 15 to 30 percent of a producer's base area when old-crop U.S. wheat carryover stocks exceed 1.0 billion bushels (27.2 million metric tons). Maximum land-idling requirements are 15 percent of the base when carryover stocks drop to or below 1.0 billion bushels. As has traditionally been the case, U.S. soybeans have no land-idling provisions

In addition to land-idling features in individual commodity programs, the Food Security Act of 1985 provides for a long-term program that is required to idle up to 40 to 45 million acres (16.2 to 18.2 million hectares) of erosion-prone cropland for 10 years. The 40 to 45 million acre goal is intended to be reached by 1990, and would represent 11 to 12 percent of all U.S. cropland. Land idled under this program must be planted to trees or grass, and mechanical harvesting of these products is forbidden during the life of the contract. Land being idled under this program is well below average in productivity, since it represents steeper-sloping fields and land in less humid areas that is subject to wind erosion. A sizable part of the land idled under the long-term program is coming from wheat, other small grains, and soybean production. Through late spring of 1988, U.S. farmers had enrolled approximately 27 million acres (10.9 million hectares) in this program. The 1985 farm act also contains "sodbuster" and "swampbuster" provisions, which provide that farmers bringing such land into production will be ineligible for government program benefits.

Grain Reserve Programs

In the early 1980s, the Farmer-Owned Grain Reserve Program was a key supply management tool in U.S. farm policies. When supplies exceeded market demand, farmers were paid to continue storing grain for three to five years, and were permitted to sell such grain only if prices rose sharply or if the grain was deteriorating in quality. The reserve program remains in effect for the years immediately ahead. However, 1985 and early 1988 legislation place upper and lower limits on the amount of grain in the reserve. For wheat, the upper limit is 30 percent of estimated total annual domestic and export usage, with the lower limit being 300 million bushels (8.2 million metric tons). The standard upper limit on feed grain reserve stocks is 15 percent of total annual domestic usage. The minimum feed grain reserve is 450 million bushels (11.4 million metric tons). Higher reserves equal to 110 percent of these maximum levels can be established at the secretary's discretion. Maximum limits on reserve stocks became effective in the 1986-87 marketing year, and prevented entry of 1986 and 1987 crops into the reserve.

Implications for U.S. and World Agriculture

The 1985 Food Security Act is a complex piece of legislation that could be modified by Congress, but it is likely to provide the overall direction for U.S. farm policy until the end of the decade. It represents a shift in U.S. price support programs somewhat in the direction of the EC support system, with domestic crop incomes to U.S. producers being supported well above world levels through the target price system. However, one important difference from the EC grain price support system is that U.S. farmers are required to idle a substantial part of their cropland to qualify for price and income supports. The policy changes in the 1985 legislation have exerted sharp downward pressure on U.S. and world grain prices from levels of the late 1970s and early 1980s. Low U.S. price supports should somewhat reduce incentives for increased corn and wheat production in other exporting nations, and have tended to increase grain utilization by making livestock and poultry products affordable to a larger segment of the developing world. These developments, as of mid-1988, and a severe U.S. and Canadian drought are beginning to move grain production and utilization toward equilibrium levels.

Reduced U.S. price support levels sharply reduced grain prices received by farmers in 1986 through early 1988 in such exporting nations as Canada, Argentina, Brazil, Australia, South Africa, and Thailand from levels of the early 1980s. In countries such as the EC nations where domestic agricultural programs support prices well above world levels, government expenditures for farm programs have risen sharply. Political pressure in the EC is shifting toward lower agricultural price supports and possible cropland-idling programs. In importing nations, lower prices are advantageous for domestic consumers in the short run, but will work against incentives for increased self-sufficiency in agricultural products in the longer run. In addition, the lower level of world prices in the late 1980s increased temptations of the U.S. and other nations to follow protectionist trade practices, such as import restrictions to shield domestic producers from foreign competition. For example, Canada in 1987 implemented an import tax on U.S. corn to protect Canadian corn producers.

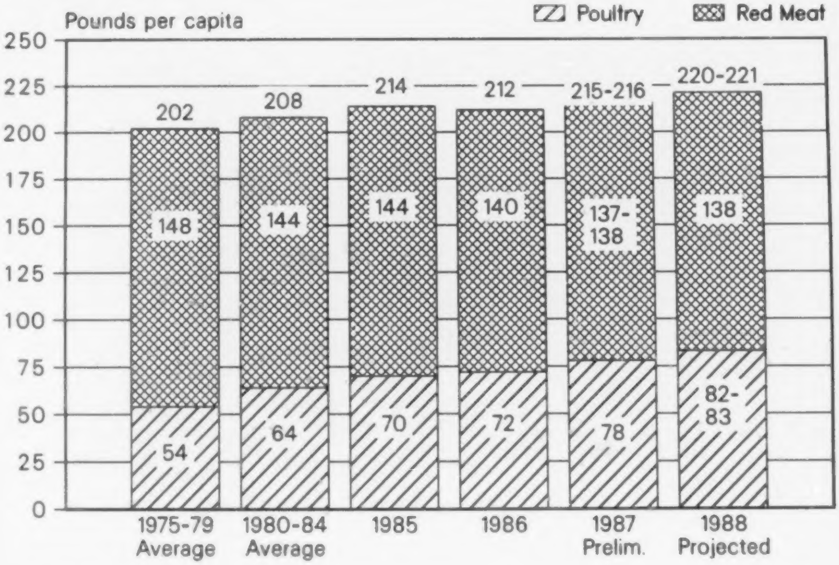
In the struggle to expand agricultural export shares, a trade subsidy was has been waged by the U.S. and the EC. Export subsidies were used heavily on wheat and barley, and to a lesser extent on sorghum and vegetable oils, in 1987 and 1988. In some cases, the export subsidies reduced the cost of the product to foreign buyers by one-fourth or more from world market price levels. However, with the record large decline in U.S. wheat carryover stocks in 1988, export subsidies may diminish somewhat in the next few years.

U.S. Meat Consumption Shifts Toward Poultry

In the last decade, a major change occurred in U.S. diets with consumers reducing consumption of red meat (beef and pork) and dramatically increasing consumption of poultry (chicken and turkey).[47] These trends, shown in Figure 49, reflect a number of influences including a desire of consumers to reduce intake of fat and cholesterol, thus reducing the risk of cardiovascular disease, which is the leading cause of death in the U.S. In addition, several new products have been developed by the poultry industry and marketed through fast-food restaurants. The poultry industry also has developed convenience products portioned and packaged for quick preparation at home to meet needs stemming from sharply increased employment of women in the labor force. In this area, innovations in poultry products appear to have substantially outpaced those in the red meat industry. The rapid adoption of microwave cooking units in American homes may also have contributed to this trend, since poultry products in some cases are more suited for microwave cooking.

These trends are expected to continue in the next few years, and may also occur in other industrialized nations. If so, they may have important implications for grain producers, handlers, and exporters. Poultry production requires much less grain per pound of meat than pork and grain-fed beef. In other words, the trend toward poultry production is releasing a modest additional amount of U.S. grain for export or other uses in recent years that would not have been available under previous dietary patterns. Similar trends in other areas such as Western Europe, Canada, and the USSR could slightly increase world availability of grain for export and slightly restrain the growth in global grain trade. These trends also have important implications for the red meat industry in areas of product innovations, pressures to increase feed conversion efficiency and productivity, investment prospects in industries producing inputs used in livestock production, and in livestock marketing and processing industries.

Figure 49. U.S. Per Capita Meat Consumption, 1975-88.



Source: U.S. Department of Agriculture, Economic Research Service, *Livestock and Poultry Situation and Outlook Report*, LPS-29, May 1988; various other issues.

U.S.-European Community Trade Tensions Continue[48]

U.S.-EC trade tensions increased sharply in 1986-87 and 1987-88, partly because of the U.S. position on the General Agreement on Tariffs and Trade (GATT) negotiations (discussed in a later section of this report), as well as continued large EC export subsidies on farm products and negative impact of the recent entrance of Spain and Portugal into the EC on U.S. grain exports. Other developments contributing to trade tensions included large excess grain supplies in both the U.S. and the EC, the EC's shift to exports of maize (corn) to third countries, a threatened EC tax on vegetable oils, sharply expanded EC oilseed production (noted in the oilseeds section of this report), growing EC and U.S. costs of farm programs, and a large U.S. nonagricultural trade deficit with EC nations. After threats and counterthreats that large duties would be placed on imports of key farm products, the two sides reached a temporary reconciliation when the EC agreed to expand its grain imports to compensate for Spain's and Portugal's entrance to the community.

The four-year U.S.-EC agreement, reached in February 1987, included EC commitments to permit 2 million metric tons of corn (maize) and 0.3 million tons of sorghum to be imported into Spain annually under reduced levies and elimination of Portugal's requirement to purchase 15 percent of its coarse grain requirements from EC nations.[49] The agreement also included an extension of the EC's zero duty on corn gluten feed and soybean meal to Spain and Portugal. However, Spanish imports of grain substitutes such as corn gluten feed, distillers, dried grains, and citrus pellets can be counted toward its allowed quantity of coarse grain imports.[50] Spain's and Portugal's imports of these products are likely to increase considerably in the years ahead since import duties and levies are not applied to them. Over the longer term, the agreement likely will not greatly alter changes in Spain-Portugal imports from patterns that would otherwise have occurred. In the short run, it does not provide guaranteed access of U.S. grain to Spain and Portugal, since other non-EC countries can compete for that market. Moreover, it does not prohibit the EC from exporting an equal volume of its own coarse grain and wheat to offset required non-EC imports into Spain and Portugal. Thus, the February 1987 agreement is not likely to be a permanent solution to U.S.-EC trade tensions.

Oil Importing and Exporting Nations and U.S. Agricultural Exports

From the last quarter of 1985 to the first quarter of 1986, world petroleum prices declined by over 50 percent. Moderately higher prices since then have offset part of the decline, but in mid-1988 U.S. and world energy prices remained sharply below the levels prior to late 1985. Lower oil prices have the potential to affect agriculture in both positive and negative directions. On the positive side, energy is a major input in both the agricultural and nonagricultural sectors of the world economy. Its price affects the cost of producing many major farm inputs, as well as costs of conditioning, processing, and transporting agricultural products. Lower energy costs reduced U.S. and foreign inflation rates in 1986 and 1987, thus permitting slightly lower interest rates than otherwise would have been possible. The decline in energy costs from levels of the early 1980s also tended to slightly reduce per unit production costs for U.S. farm products, and has been a positive factor in easing the U.S. farm financial crisis.

Lower petroleum prices also are a positive influence on U.S. demand for farm products, as well as on the demand for food and fiber in a large number of oil-importing nations. Reduced oil prices provide consumers with additional funds that can be used for dietary improvements, as well as for other purposes. Over time, if moderate energy prices are sustained for several years, this development likely will help generate increased demand for livestock and poultry products in oil-importing developing nations. In the U.S., consumers used part of the energy cost savings to reduce debts and replace durable goods worn out during the years of high interest rates and rapid inflation. Even so, lower petroleum prices than in the late 1970s and early 1980s probably have had a slight positive effect on U.S. demand for farm products. The demand effect may have been largest in such major oil-importing countries as Japan, Korea, Taiwan, Brazil, and Argentina, as well as slightly positive in Eastern and Western Europe. In Brazil and Argentina, moderate energy costs, if they are maintained near mid-1988 levels, may help accelerate domestic economic growth, increasing domestic demand for farm products and tending to reduce export availabilities from levels that would otherwise exist. Reduced energy import costs also are a positive influence on the balance of trade for these nations, and tend to slightly ease external debt-servicing problems.

Lower petroleum prices raise questions about the impact on U.S. agricultural exports to oil-exporting nations. U.S. agricultural exports to these countries as a group increased substantially in the 1970s and early 1980s. In the last two years, sharply reduced purchasing power as a result of lower oil prices in some cases has been partially offset by U.S. government export assistance programs.

U.S. agricultural exports likely to be most affected by changing petroleum prices include poultry and poultry products, other meats, and wheat. Imports of these products by oil-exporting nations as a group grew rapidly from 1972 to 1981 (see Table 20), as large oil revenues brought dietary changes. Since the early 1980s, however, agricultural imports of oil-exporting nations have become quite variable from year to year. Growth in the 1970s and early 1980s was most pronounced for poultry imports, with a 939 percent expansion between 1972 and 1981. But by 1984, poultry imports by oil exporters as a group had slipped 29 percent below the 1981 record, with declines in most areas except the North Sea and other developing nations. Other meat imports by oil exporters as a group rose by 165 percent from 1972 to 1981 and have remained fairly stable since that time. Wheat and flour imports by these nations more than doubled from 1972 to 1984, but have since declined by about one-seventh. However, wheat and flour imports by the Middle East and North Africa have continued to show an irregular upward trend since 1984. Wheat and flour imports by oil-exporting nations outside these regions have been somewhat variable since 1984.

Future U.S. agricultural exports to oil-exporting nations likely will be sensitive to trends in petroleum prices. Through mid-1988, the moderate petroleum prices appeared to be reducing oil revenues to Middle East and North African nations by approximately $15 to $25 billion per year from levels of the early 1980s. Lower energy prices reflect conservation efforts and new technology in insulation, transportation, heating, and cooling resulting from rapidly rising prices of the 1970s. Other factors include the development of alternative energy sources and substantially increased petroleum production in non-OPEC regions in the last decade, including the North Sea, Mexico, and the north slope of Alaska.

Table 20. Imports of Selected Products by Oil-Exporting Nations, Selected Years, 1972-82 and 1984 through 1986.

Product and Region	1972	1977	1980	1982	1984	1985	1986
Poultry (000 metric tons)							
Middle East and N. Africa	26.0	192.0	458.7	570.4	442.7	409.7	432.1
Western Hemisphere	6.8	25.6	24.9	39.1	37.0	39.6	37.4
North Sea	9.6	10.7	28.7	28.2	54.2	63.8	93.4
USSR	44.9	120.7	159.0	260.2	113.8	141.2	175.1
Other Developing Nations	6.6	28.1	23.6	30.1	22.7	61.6	57.4
Total	93.9	377.1	694.9	928.0	670.4	715.9	795.4
Other Meats (000 metric tons)[a]							
Middle East and N. Africa	51.1	434.1	916.3	1200.7	1194.9	1149.3	1166.7
Western Hemisphere	120.4	206.5	143.7	179.4	187.5	237.2	250.3
North Sea	793.2	643.5	609.6	564.2	472.0	466.7	591.3
USSR	40.1	439.9	580.6	594.4	666.3	691.5	760.9
Other Developing Nations	45.0	66.8	88.5	142.7	133.5	156.4	135.3
Total	1049.8	1790.8	2338.7	2681.4	2654.2	2701.1	2904.5
Wheat and Flour (mil. metric tons)							
Middle East and N. Africa	5.097	10.292	14.368	15.340	20.453	18.750	24.860
Western Hemisphere	1.481	1.423	1.908	1.498	1.568	1.651	1.420
North Sea	4.714	4.172	2.636	2.009	1.474	2.034	2.250
USSR	8.481	7.142	16.032	22.160	27.279	20.573	14.395
Other Developing Nations	2.456	2.615	3.839	3.605	3.362	3.905	3.860
Total	22.229	25.644	38.783	44.612	54.136	46.913	46.785

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

[a] Other meats = meat, fresh, chilled or frozen, excluding poultry meat fresh, chilled, or frozen.

Since 1977, OPEC's crude oil production reportedly has fallen approximately 50 percent, with its share of world oil exports dropping from two-thirds to one-third.

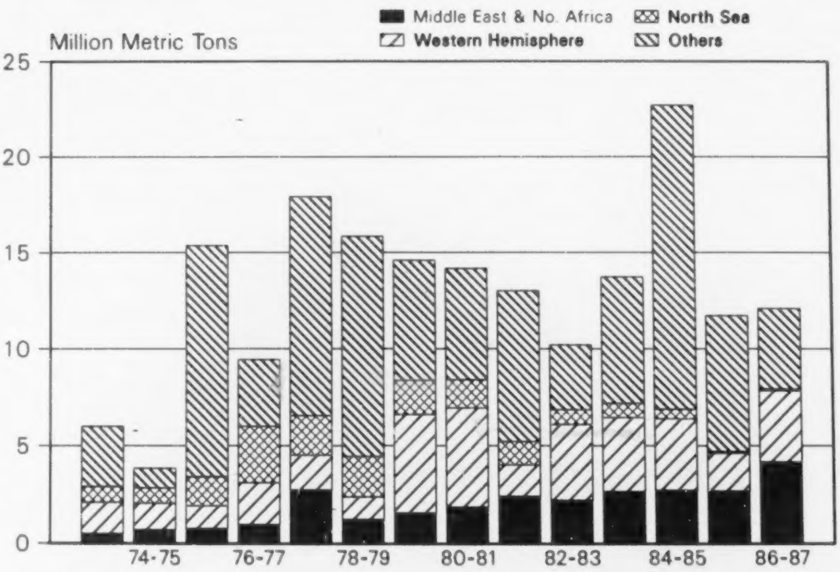
The trend toward energy conservation may slow in the next few years after recent large gains in automobile and truck fuel efficiency ratings, but probably will not be halted completely. The decline in petroleum prices in the mid-1980s reduced oil exploration activities and also caused production to be halted in some marginal producing areas. These developments may gradually tighten world petroleum supplies in the 1990s. OPEC's much smaller market share than in the 1970s, however, may temper increases in petroleum prices in the next one to three years. If so, oil export revenues likely will continue to restrain oil exporters' purchases of agricultural imports. However, the U.S. Export Enhancement Program (EEP) for wheat, flour, and barley has been targeted strongly toward nations in the Middle East and North Africa, and may continue to help offset negative impacts on these oil exporters from limited oil export revenues.

U.S. Exports to Oil Exporting Nations Still Large

As Figures 50 and 51 show, U.S. corn and wheat exports to Middle East, North African, and other Asian oil-exporting developing nations grew rapidly during the 1970s but have been followed by considerable variability in the 1980s. Combined U.S. corn exports to these areas in the 1986-87 marketing year accounted for 11 percent of all U.S. corn exports, with an additional 8 percent being shipped to oil-exporting nations in the Western Hemisphere. When the Soviet Union is included, 31 percent of the 1986-87 U.S. corn exports went to oil-exporting nations. About 42 percent of the total U.S. June-May 1986-87 wheat exports went to oil-exporting nations. Approximately one-third of all U.S. wheat exports in 1986-87 were shipped to oil exporters in the Middle East and Africa, 6 percent to Western Hemisphere oil exporters, and 3 percent to other non-Soviet developing nations. No U.S. wheat exports in 1986-87 went to the USSR.

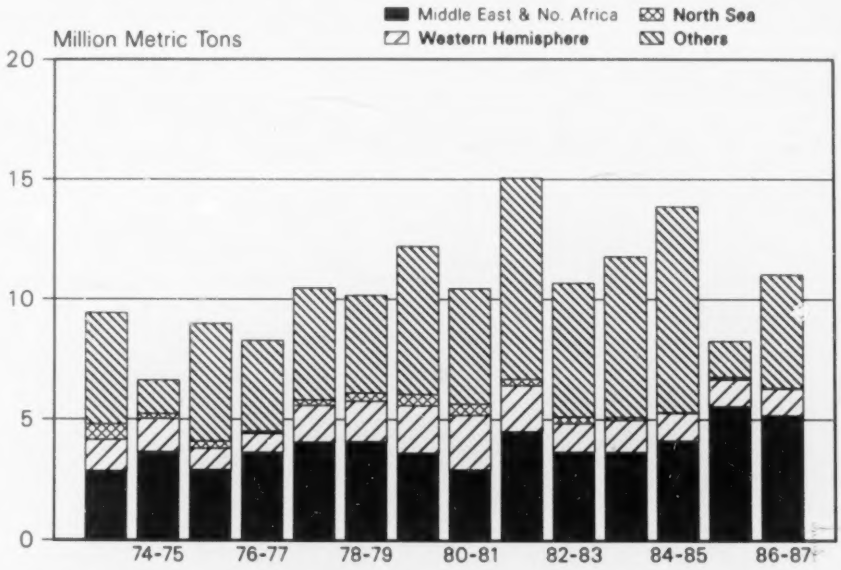
With such sizable percentages of U.S. corn and wheat exports purchased by oil-exporting nations, petroleum prices remain a potential influence on grain export trends. However, the exact level of U.S. grain exports to these nations will depend on their domestic grain production, priorities

Figure 50. U.S. Corn Exports to Oil Exporting Nations, 1973-74 through 1986-87.



Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

Figure 51. U.S. Wheat Exports to Oil Exporting Nations, 1973-74 through 1986-87.



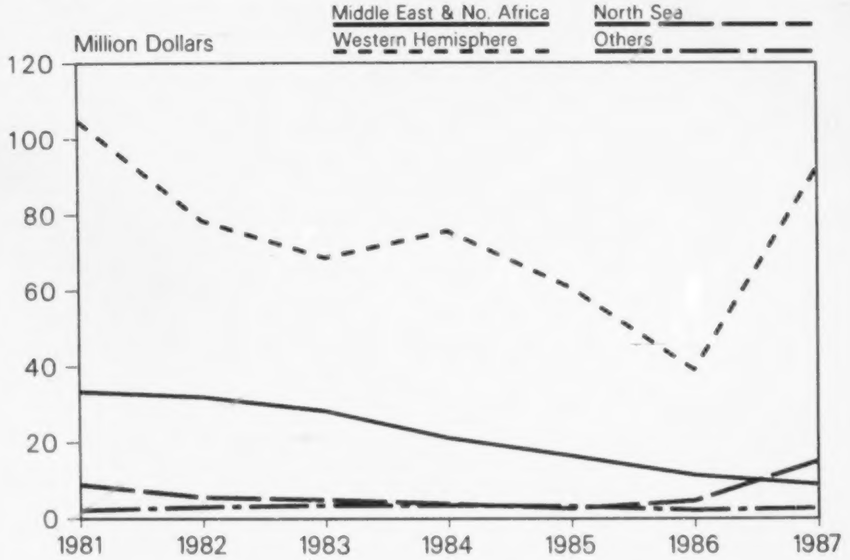
Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

placed on food versus industrial imports, political relationships with the U.S. and most importantly by the U.S. government Export Enhancement and export assistance programs. In 1987-88, the EEP for wheat was targeted heavily to Middle East and North African countries as well as the USSR, India, and China. Large U.S. barley sales also were made to Saudi Arabia under the same program. The EEP has reduced the cost of grain to recipient nations by up to one-fourth to one-third from prevailing market prices, and by 50 percent or more from levels of the early 1980s, and has helped offset restrained oil export revenues.

Trends in U.S. exports to non-Middle East oil-exporting nations indicate most of those areas have reduced their U.S. grain imports substantially in the last few years in response to various economic forces. Without offsetting export assistance programs from the U.S., it would not be surprising to see exports to these countries remain near recent levels during the next one to three years. Soviet imports may be influenced some by slowly rising petroleum revenues, but also will depend heavily on that nation's domestic grain production levels and the priority given to maintaining or increasing per capita availability of meat, poultry, and dairy products.

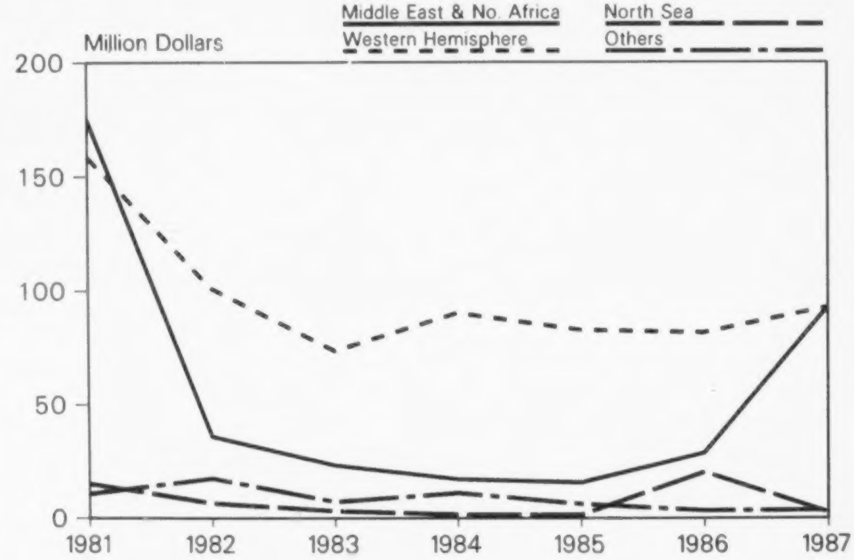
Except for shipments to a few oil exporters in the other developing nations category (primarily Malaysia and Indonesia), U.S. red meat and poultry exports to oil-exporting nations have performed much less favorably than grains (see Figures 52 and 53). U.S. exports of meat to nearly all oil exporters have dropped sharply since the start of the decade. The decline reflects pressure on consumer incomes in some oil-exporting nations and growth in domestic meat production in others.

Figure 52. U.S. Red Meat Exports to Oil Exporting Nations, 1981 through 1987.



Source: Personal communications with officials of U.S. Department of Agriculture, Economic Research Service; and Foreign Agricultural Service, *Dairy, Livestock, and Poultry: U.S. Trade and Prospects*, FDLP 3-88, March 1988.

Figure 53. U.S. Poultry Exports to Oil Exporting Nations, 1981 through 1987.



Source: Personal communications with officials of U.S. Department of Agriculture, Economic Research Service; Foreign Agricultural Service, *Dairy, Livestock, and Poultry: U.S. Trade and Prospects*, FDLP 3-88, March 1988; and Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988.

Barter Trading and U.S. Exports

In the last few years, barter trading or countertrade has increased in importance for developing nations and centrally planned economies. While not a new development, its growing importance was recognized in the U.S. Food Security Act of 1985. This legislation includes a strong encouragement from Congress for the U.S. to become involved in barter trading for strategic raw materials. The act authorizes barter trading with CCC-owned U.S. agricultural commodities, and instructs the Secretary of Agriculture to provide technical assistance in such trading for U.S. exporters who request it.[51]

Motivations behind barter trading include a lack of foreign exchange in developing nations and inadequate financing to obtain needed imports through more usual marketing methods. Barter trading may include exchange of goods and/or services from one country for goods and services of another. In other variations, it can include pre-agreed counterpurchases from the trading partner or bilateral clearing accounts.[52] Some observers express concern that this process bypasses normal market mechanisms. In that way, it may avoid realistic price determination on products being traded and may insulate exporters from consumer quality demands that normally would be communicated through market channels. As a result, prices in barter trading may be artificially high, quality of goods may be low, and dumping of products into developed countries at prices below original production and marketing costs may occur.

The U.S. barter trade in farm products never has been very large, even though the practice was used by the U.S. as far back as the 1950s. Because of its weaknesses, it is unlikely to grow into a major outlet for the nation's agricultural exports. Despite its limitations, barter trade can be advantageous for some countries, and in some cases it conceivably could be a tool to facilitate economic growth and later development of more conventional markets for farm products.

Longer-Term Trade Prospects Improve

With dramatic changes in U.S. agricultural policy that have been in effect since mid-1986, a key question for both the production agriculture and agribusiness sectors is: "Will the lower farm price support levels maintain the recent recovery in the U.S. share of world agriculture trade and encourage expanded U.S. exports in the next few years?". To answer this question, a research group at Iowa State University and the University of Missouri has developed econometric forecasts of U.S. and world trade in major agricultural commodities to 1996-97.[53] These forecasts are based on the assumptions of no major weather disasters or political upheavals, no major business recession, and no major alterations of U.S. agricultural policies from those prescribed by the U.S. Food Security Act of 1985.

The forecasts show a continuation of recent trends in world agriculture, with consumption of major grains remaining in a gradual long-term upward trend. Area planted to grains is expected to remain nearly constant in most major grain exporting nations, with the exception of a moderate increase in the U.S. in the last half of the period as government land-idling incentives are reduced. Yields both in U.S. and non-U.S. producing areas are forecast to increase modestly through the late 1990s, and to adequately meet the anticipated growth in world consumption. India is projected to gradually increase its position as a net importer of wheat, along with relatively steady Chinese wheat exports. Soviet feed grain imports are projected to trend moderately upward as its grain production lags behind growing domestic demand. The EC coarse grain exports are expected to increase substantially, more than doubling from 1988-89 to 1996-97.

Part of the substantial growth in U.S. wheat and coarse grain exports of the past two years is forecast to be lost in the next few years, before being regained by the 1996-97 trade year. However, 1996-97 U.S. coarse grain exports are projected to remain about 3 percent below the record 1979-80 level of 71 million metric tons. U.S. wheat exports in 1996-97 are projected to be about 7 percent below the record level of 48.2 million metric tons reached in 1981-82. Soybean exports from the U.S. are projected to expand modestly but remain 9 percent below the 1981-82 record in 1996-97, because of expanded oilseed production in Western Europe, South America, and other areas. Continued growth in exports, increased U.S. domestic processing and grain feeding, and government incentives to reduce crop plantings are forecast to hold U.S. carryover stocks of major grains below recent highs. However, U.S. soybean carryover stocks are projected to increase in the early 1990s and then stabilize through 1996-97. By 1996-97, ending U.S. corn carryover stocks are projected to be about one-third the 1986-87 level. Corn prices received by farmers are forecast to increase from 1986-87 levels in current dollars, reaching an average of about $2.40 per bushel ($94.56 per metric ton) in 1996-97. Prices at that level would be about one-third higher than in 1986-87. U.S. wheat carryover stocks are indicated to be at about two-fifths the 1986-87 level by 1996-97. Wheat prices are projected to increase from 1986-87, with 1996-97 prices also being about one-third above the 1986-87 average. Cotton carryover stocks are indicated to remain relatively steady during much of the forecast period. Prices for both soybeans and cotton are forecast to trend slightly upward from 1986-87 levels in the 1990s, but at a much slower rate than for corn and wheat.

These forecasts of U.S. and world exports of major crops are summarized in Table 21. In general, they indicate continued excess production capacity in U.S. agriculture into the mid-1990s, provided the drought of 1988 does not continue in future years. The excess capacity will be restrained somewhat by the long-term land-idling program specified in the Food Security Act of 1985. Barring major weather problems, however, this program may be needed for a few more

Table 21. U.S. and World Net Export Forecasts for Wheat, Coarse Grains, Soybeans, and Soybean Meal in 1990-91 and 1996-97, and Comparisons with 1987-88 in Millions of Metric Tons.

Commodity	Prelim. 1987-88	Forecast 1990-91	Forecast 1996-97
World wheat	104.4	91.94	102.15
U.S. wheat	43.5	39.01	44.57
Non-U.S. wheat	60.9	52.93	57.58
U.S., percent of world	41.7	42.4	43.6
World coarse grains	82.7	81.01	106.03
U.S. coarse grains	52.3	52.43	68.76
Non-U.S. coarse grains	30.4	28.58	37.27
U.S., percent of world	63.2	64.7	64.8
World soybeans	29.72	27.96	30.19
U.S. soybeans	21.78	20.60	23.13
Non-U.S. soybeans	7.94	7.36	7.06
U.S., percent of world	73.3	73.7	76.6
World soybean meal	25.51	22.48	27.62
U.S. soybean meal	6.08	6.75	9.61
Non-U.S. soybean meal	19.43	15.73	18.01
U.S., percent of world	23.8	30.0	34.8

Sources: Forecasts are from FAPRI *Agricultural Outlook*, Food and Agricultural Policy Research Institute, Iowa State University (Ames, Iowa), and University of Missouri (Columbia, Mo.), Spring 1988. The 1987-88 data are from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988, and *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 8-88, August 1988.

years to hold the nation's feed grain carryover stocks at levels generally considered acceptable in the U.S. In the meantime, costs of U.S. farm income support and export subsidy programs will be large, and could conceivably generate pressure to modify the 1985 farm legislation. Part of the cost of balancing global production and utilization is being transferred to other nations through lower U.S. price support levels and a greatly reduced willingness of the U.S. to support world crop prices. These costs are occurring in the form of large farm program costs in EC and other nations protecting domestic agriculture from import competition, and restrained farm incomes and asset values in areas such as Canada, Australia, and parts of Latin America where government farm income support programs traditionally have been limited. Other dimensions of these costs include reduced incentives to increase food self-sufficiency in developing nations that have chronic food shortages, and higher food costs to consumers in industrialized nations that use import barriers, relative to food costs as reflected in the world market.

GATT Negotiations Progressing Slowly

The eighth round of the General Agreement on Tariffs and Trade (GATT) Multilateral Trade Negotiations (MTN) began with an early 1987 meeting in Uruguay. The negotiations are expected to require another one and one-half or two and one-half years for completion. At this writing, 96 nations are participating in the negotiations.[54] Previous GATT negotiations had focused more on nonagricultural trade issues. But with widespread concern about protectionism, increased subsidies in agricultural trade, and depressed farm incomes, participating nations have moved agricultural trade issues to the forefront. These negotiations are an effort by major industrial and agricultural exporting and importing nations to agree to reduce import restrictions and subsidies on exports of raw and processed farm products. If successful, the outcome would have important implications for agricultural producers and consumers throughout the world.

GATT and Its Origins[55]

GATT had its origins in 1946 and 1947 meetings at which the International Monetary Fund (IMF) and a fixed system of currency exchange rates were established after World War II. The U.S. at that time proposed three organizations for dealing with international financing and trade problems: (1) the IMF, (2) the World Bank, and (3) the International Trade Organization. The proposed International Trade Organization would have been assigned the tasks of promoting trade liberalization and enforcing trade policy agreements. The first two organizations were approved, but the U.S. Congress vetoed the International Trade Organization because of an unwillingness to transfer domestic policy to an international organization. In its place, GATT was established to encourage trade liberalization. However, GATT was not given enforcement powers. GATT is a set of trading rights and obligations voluntarily entered into by a group of nations who are signatures to the agreement. To compensate for the absence of enforcement powers, other nations have the ability to withdraw concessions from a GATT member that has been determined to be in violation of trading rules.[56] GATT specifies rules and guidelines for international trade, provides a forum for discussion of trade problems, and includes means by which members can formally challenge other members' trading practices and policies. The importance of these procedures to agriculture is illustrated by the fact that over half of the cases of trade practices being challenged by the U.S. in late 1985 involved agricultural products, with most relating to the EC, Japan, and Canada.[57]

The U.S. had a major influence in the origin and development of the purposes for GATT. From the start, GATT rules provided special treatment for agricultural imports and exports that were not available to industrial products. For example, GATT provisions include four articles dealing with quantitative restrictions on imports of agricultural products. These include Article XI prohibiting the use of quotas (with certain exceptions), Article XII providing an exception in the use of quotas for balance of payment reasons, Article XIII outlining rules where other exceptions are applied and quotas may be used, and Article XIV providing additional exceptions to Article XIII in cases of certain balance of payment situations.[58] In original GATT rules in Article XVI 1, subsidies on exports were permitted, with a requirement that they be reported. In 1955, rules were modified to require that nations not use subsidies on primary products to obtain more than an equitable share of world trade in the product or products in question. Regulations at that time were extended to prohibit subsidies on non-primary product exports, thus bringing a distinction between farm and non-farm products. Efforts to clarify these regulations were made during the 1979 Tokyo Round of GATT negotiations, but with little success.[59]

Because of its prominence as an agricultural producer and its strong post-war political position, the U.S. in 1955 was able to obtain a waiver of GATT regulations that allowed the U.S. to impose quantitative restrictions on agricultural imports under Section 22 of the U.S. Agricultural Adjustment Act.[60] The Section 22 waiver permits the U.S. to implement import quotas if imports into the U.S. threaten its ability to manage certain domestic commodity programs. U.S. efforts also were a major factor in obtaining rules that excluded agriculture from prohibitions on export subsidies. When these exceptions were obtained, they were contrary to the purposes of GATT but did not cause major concern in a world where agricultural trade was much smaller than it is today and where only a few net agricultural exporting nations existed.

World agricultural trade in farm products has changed dramatically since the post-war decade, and these special exclusions are now causing problems for both the U.S. and many of its trading partners. In the late 1940s and 1950s, U.S. agriculture was much less dependent on exports as a source of income and a means of more fully utilizing its production capacity. Few other major agricultural exporters existed, so resistance to allowing agricultural export subsidies and U.S. import quotas was limited. Concerns about these provisions also were relatively minor during the 1970s, with rapidly expanding world import demand for farm products and with several nations shifting from net exporters to net importers.

However, in the 1980s with large agricultural surpluses, recent low world grain prices, several nations shifting from grain importers to exporters, a major agricultural trade subsidy war between the U.S. and the EC, and growing protectionism, there is a strong need to reconsider GATT regulations relating to agriculture. A multinational approach may well be needed to bring an end to the current trade war. The reason for this is that if one participant attempted to halt the subsidy war unilaterally, that nation would face a high risk that its export market share would decline sharply as competing countries keep their subsidies in place.[61]

Broad objectives of the Uruguay round of GATT negotiations as established at a meeting in Punta del Este, Uruguay in early 1987 are: (1) to improve market access through reduced import barriers, (2) to increase discipline in the use of trade subsidies, and reduce their adverse effects, and (3) to deal with the underlying causes of trade subsidies.[62]

Requirement for Effective GATT Negotiations

Protection of domestic agricultural sectors is a major factor in current international trade policy issues. For example, the EC protects its grain producers with a complex system of price supports that in some cases holds domestic prices at nearly double the world market price, and includes large variable import levies or duties which discourage imports.[63] A major objective of EC farm policy has been to provide self-sufficiency in farm products and to avoid a repeat of major food shortages that occurred during and immediately after World War II. That objective has been attained, and the EC is now one of the world's largest agricultural exporters. Its policy objectives also have included efforts to maintain a large number of relatively small farms.

The U.S. has highly protective policies relating to its sugar and dairy industries, including import controls and support prices that are well above world markets. It also has a system of deficiency payments to protect crop producers if world prices fall below specific target prices.[64] These crop payments, however, are different than domestic price support systems in other nations, since U.S. producers are required to idle a significant part of their cropland to qualify for the price supports. In addition, the U.S. has subsidies for the alcohol fuels industry in the form of motor fuel tax exemptions for alcohol fuels. In a sense, these tax exemptions are a protection for the industry and a subsidy for exports of by-product feeds produced in the manufacturing of alcohol fuels.[65]

Brazil and Argentina have different export taxes on processed soybean products than on raw soybeans to encourage domestic processing of soybeans and export of value-added crops. EC policies also are structured to favor importing of oilseeds for processing over imports of processed products. Japan has very high domestic support prices for producers of rice and other grains to ensure some minimal level of food self-sufficiency, and allows no imports of rice. The Japanese people no doubt consider a minimal level of raw farm product production essential for national security in a nation already heavily dependent on foreign food supplies and with a very limited domestic cropland base. Japan also has other major restrictions on agricultural imports including quotas on meat imports, quotas on imports of corn for industrial processing, and restrictions preventing livestock and poultry producers from buying unprocessed imported corn or sorghum and grinding and mixing it with other feed ingredients on their farms.[66]

These are only a few examples of major restrictions on agricultural trade that exist around the world. For the GATT negotiations to be fully effective in meeting the objective of liberalizing agricultural trade policies, major participating nations will need to be willing to subject their domestic farm policies to negotiation in an international setting, and their respective legislative bodies will need to provide negotiators with authority for such negotiation.[67] Domestic policies of the U.S., the EC, Japan, and other nations stem from unique sets of social, cultural, historical, geographic, and economic conditions, and national values arising from those conditions. For example, it is doubtful that the U.S. Congress would be willing to delegate authority to completely negotiate away the U.S. target price system for grains or the basic system of sugar and dairy import restrictions and price support programs. For similar reasons, it is doubtful that the EC would provide authority to completely negotiate away its variable levy pricing system on grain imports. It also is doubtful that Japan would provide authority to negotiate away all rice import restrictions, thus greatly reducing self-sufficiency in what historically has been its most basic food. That would leave the nation more vulnerable to food trade disruptions resulting from war, labor strikes, political embargoes, or other unpredictable events.

Emerging GATT Positions[68]

By mid-1988, three main GATT negotiating positions had emerged: those of (1) the U.S., (2) the Cairns group, and (3) Japan-EC. The U.S. position was put forth in mid-1987 as key issues and areas of concern were being developed. It basically is to work toward a gradual elimination of agricultural subsidies globally. The target date for complete elimination of subsidies and other practices that affect trade in farm products is the year 2000.[69] Many groups and analysts view full attainment of this position as an unrealistic goal since it would require many nations, including the U.S., to conform their goals and values about agriculture to those of other nations, including countries that have much different resource bases, a different national history, and major cultural differences. Other observers note that in this round of GATT negotiations, as in all other previous rounds, the negotiations will be divided between two U.S. administrations. The next U.S. administration might not pursue this goal with the same enthusiasm as President Reagan. However, support in the U.S. for major changes in world trading rules is broad-based and bipartisan as evidenced by passage of the 1985 Food Security Act and a major 1988 U.S. trade bill. Direct and indirect costs to the U.S. under current global trading practices were important considerations behind both bills. Still other analysts note that the economic climate of world agriculture today is much different than in the past. Agriculture is becoming increasingly internationalized and dependent on world financial conditions. Restrictive agricultural trade policies have a very high cost in many industrialized nations through direct government expenditures and/or added costs to consumers in purchasing agricultural products. The present economic environment thus may make global elimination of agricultural subsidies a somewhat more realistic goal than in the past, although very major obstacles to its attainment remain.

One observer notes that "losers" in such an outcome would include nearly all agricultural producers in Japan and the EC, as well as a number of groups of highly protected producers in the U.S. and some other nations. Potential gainers would include consumers and taxpayers in Japan, the EC, and the U.S., and low-cost producers in countries such as Argentina, Australia, Canada, and parts of the U.S.[70] This, of course, is only a partial list of gainers and losers. Consumers, taxpayers, and producers in major importing countries also could be grouped into these two categories. But this partial list identifies some politically powerful groups that are likely to have strong opposition to complete elimination of agricultural subsidies.

The EC-Japan negotiating position is that complete elimination of government subsidies for agriculture is an unrealistic goal and one that is not applied to other industries. The proponents of this position believe elimination of subsidies would cause severe market disruptions, but that some reduction in subsidies, trade barriers, and other forms of market distortion is appropriate. The EC position also includes considerable emphasis on maintenance of proportional shares of world trade. Japan insists that individual countries be permitted to subsidize their producers to ensure food security. Both viewpoints come at least partly from a background of internal food shortages a few decades ago and different societal values relating to the structure of agriculture.

The Cairns group consists of 14 nations that are large agricultural exporters who have been affected adversely by the U.S.-EC export subsidy war. It includes Australia, Argentina, Thailand, Brazil, and several other nations. This group traditionally has subsidized the majority of its agricultural producers at low levels or not at all. For several major products, its producers also are the "low-cost" category and thus could benefit from a less restrictive global trade environment. This group's position is similar to that of the U.S. It favors removal of import barriers and export subsidies along with other agricultural support programs that affect trade. However, agricultural research and extension programs and income support payments not linked to production would be permitted under its proposal.

Another group with an extremely important stake in the GATT negotiations is the Third World Nations. This group has not had a well-organized position in the negotiations.

It has a wide variety of concerns including access to export markets, protection of infant agricultural processing industries, and encouraging growth of agricultural production to increase food security, provide growth in local economies and increase the availability of raw materials for processing and export, and provide adequate food supplies to its consumers at affordable prices. This group may feel that developing nations that are heavily dependent on agriculture should be given certain trade concessions that are not available to more economically developed countries.

With these complex and differing national backgrounds, a difficult and extended period of negotiation should be expected in the remainder of the Uruguay round. Although a four-year timetable was established at the initial meeting in early 1987, some analysts anticipate from previous GATT rounds that current negotiations could last as long as eight years.[71] Immediate major restructuring of domestic farm policies of nations such as the U.S., Japan, and the EC probably should not be expected to result from the negotiations. However, a gradual easing of import restrictions in some nations and a gradual reduction in use of export subsidies seems likely. Grain exporting nations such as Australia, Canada, and Argentina, who so far have remained outside the U.S.-EC export subsidy war, also will be very interested in negotiating limits on the use of export subsidies and possible time schedules for complete phasing out of their use. Otherwise, nations not currently participating in the trade subsidy war will face very unpleasant choices of accepting reduced export shares and continued restraints on incomes of their agricultural sectors, joining the subsidy war themselves, or providing large direct government income transfers to soften the impact on their farm sectors. While the GATT negotiations will continue to be difficult and controversial, some progress in dealing with current trade-related policy issues is anticipated.

The Proposed U.S.-Canadian Free Trade Agreement[72]

On January 2, 1988 the President of the United States signed an agreement negotiated by representatives of the U.S. and Canada that is intended to greatly reduce trade barriers between the two countries within 10 years. The U.S. and Canada are the world's two largest trading partners. This agreement, in a sense, provides a model for GATT negotiations, as well as an illustration of potential complexities in negotiations involving a large number of countries. At this writing, the U.S.-Canadian agreement has not yet become effective. Before it can be implemented, the agreement must be approved by the U.S. Congress, the Canadian Parliament, and individual Canadian provinces. If approved, it would have particularly important implications for U.S. and Canadian producers of fruits, vegetables, wheat, pork, and at times possibly oilseeds, as well as nonagricultural products.

The agreement calls for the elimination of most tariffs and some non-tariff barriers to agricultural and nonagricultural trade between the two countries by the year 2000. The economies of the U.S. and Canada are closely linked through U.S. corporate investments in Canada and dependence of Canadian corporations on U.S. financial markets, as well as by trade flows. The U.S. accounts for over three-fourths of Canada's total exports, while Canada is a much smaller market for U.S. exports. Canada currently imports about $2.7 billion of U.S. agricultural products annually, and the U.S. imports about $2.0 billion of Canadian agricultural products, in U.S. dollars. Horticultural products make up nearly half of Canada's agricultural imports from the U.S., in large part because of Canada's northern latitude and limited growing season. The agreement has the potential both to improve the access of U.S. fruit and vegetable producers to Canadian markets, and to substantially increase competition in Canadian markets for these products. Effects on other agricultural products are expected to be smaller in magnitude.

Key provisions of the agreement include the following: (1) elimination of all agricultural tariffs within 10 years, (2) allowance for both countries for a temporary "snap back" duty on fresh fruits and vegetables for 20 years if the import price for the commodity is below 90 percent of the average monthly import price over the preceding five years, excluding the highest and lowest years, and provided planted acreage of the commodity in question does not exceed the previous five-year average, excluding high and low years, (3) elimination of U.S. quantity restrictions on imports of Canadian products containing 10 percent or less sugar by dry weight, (4) elimination of Canadian import licenses for U.S. small grains and grain products as soon as support levels in the two countries are equalized, (5) elimination of Canadian transportation subsidies on products moving through west coast ports to the U.S., (6) increases in global Canadian import quotas for poultry and poultry products to the annual average of actual shipments during the last five years, (7) exemption of the two countries from each other's meat import laws, and (8) agreement not to use direct export subsidies on agricultural products shipped to each other.

The "snap back" duty on fresh fruit and vegetable imports must not exceed the most-favored nation duty. Also, it can be applied only once in any 12-month period, and for a maximum of 180 days at a time. The duty is to be removed immediately if the import price of the commodity exceeds 90 percent of the five-year average price for five consecutive working days. This provision reflects the vulnerability of the Canadian fruit and vegetable industry to competition from U.S. imports. With its short growing season, production in Canada is much more limited than in the U.S.

To protect the U.S. fruit and vegetable industry, the agreement also contains a provision requiring that products from a third country exported to Canada and then re-exported to the U.S. must be substantially transformed before being re-exported under the reduced tariffs of the agreement. Other details include provisions for greater access of U.S. alcoholic beverages to the Canadian market.

The U.S. is a small importer of Canadian grains, vegetable oil, soybeans, and soybean meal, despite small or modest tariffs on some of these products. For example, the U.S. has a 5 percent import tariff on feed wheat imports from Canada, a 5.7 percent tariff on food wheat, 1.5 percent on barley, 7.5 percent on edible rapeseed oil, 2.7 percent on rapeseed meal, 5.4 percent on soybean meal, and 1.7 percent on corn. Canada's additional countervailing duty on imports of U.S. corn would not be removed by the agreement. The U.S. has no tariff on soybean imports, but applies a 22.5 percent tariff on soybean oil imports along with an 8.2 percent duty on live hog imports, a 2.6 percent tariff on beef and veal imports, and a 9.8 percent duty on butter imports. The U.S. countervailing duty on live hog imports would not be removed by the agreement, and the agreement does not provide measures for liberalizing dairy trade.[73]

The scheduled reductions and eliminations of tariffs could bring some increase in Canadian product imports into the U.S. if the agreement is implemented, particularly if the Canadian currency remains weak relative to the U.S. dollar. However, potential increases in imports of most products are believed to be small. At the same time, a potential would exist for increased U.S. exports of wheat, barley, and grain products to Canada with that country's removal of import licensing requirements. Increased Canadian imports of U.S. fruits and vegetables also would be quite likely if the agreement is ratified by both sides.

The agreement also provides for easing of non-tariff barriers to U.S.-Canadian trade. Included in this category, in addition to import licensing requirements, are packaging and labeling requirements, bilingual labeling, health and sanitary regulations, grading requirements, Canadian restrictions on consignment selling of fresh fruits and vegetables from the U.S., and related restrictions.

At this writing, approval of the agreement by the U.S. and Canada is not assured. Nonagricultural considerations may largely determine whether it is ratified. Canadian supporters of the agreement point out the importance of obtaining greater access to the large U.S. market for its nonagricultural sector, particularly in view of growing foreign competition. Canadian opponents express concern that the agreement might subject their nation to greater dominance by U.S. corporate interests than now exists. If approved, U.S. commodities most likely to benefit include fruits and vegetables, wine, poultry, some grains and grain products, and beef. At times, the U.S. pork and vegetable oil industries might be affected negatively.

Linkages of U.S. Agriculture to Global Trade Policies

The financial health of U.S. agriculture and related economic sectors is recovering moderately from the severe deterioration of the previous five years, due in part to an increase in the physical volume of the nation's agricultural exports and large government payments to producers resulting from 1985 agricultural legislation. Financial stress in American agriculture and agribusiness in the last few years was evident from an unusually high percentage of U.S. farmers being forced to exit from agriculture through bankruptcy or other means, excess capacity in the U.S. agricultural marketing and transportation system that at one point was as high as 25 to 35 percent, severe financial losses and consolidation of firms and operations in the U.S. farm machinery industry, failure of the largest number of U.S. agricultural banks since the 1930s, and a sharp decline in asset values in U.S. agriculture and agribusiness. After experiencing these major stresses, financial conditions of the U.S. agricultural sector have improved significantly. However, problems remain to be resolved in parts of the Farm Credit System, and among some individual producers and agribusiness firms.

These problems also have been faced by farmers in several other nations. However, such problems, until very recently, may have been more serious in the U.S. than elsewhere for at least three reasons. First is the traditional role of U.S. farm policy as the adjustment mechanism for balancing world supply and demand. Most other exporting nations do not have a policy of building large carryover stocks when world supplies exceed demand. Instead, their agricultural sectors are structured to move excess production into world markets and maintain carryover stocks near normal levels. Longstanding U.S. policies result in much of the world's excess grain production being held in U.S. carryover stocks in years of surplus crops.[74] Thus, when foreign grain supplies are large relative to demand, U.S. exports tend to decline as other nations market their excess production. That makes the U.S. a residual supplier, and its carryover stocks rise when world production is large. Second, this process was accelerated from 1980 to 1985 by the strength of the American dollar, which placed U.S. farm product exports at a competitive disadvantage relative to other exporters. Strength of the U.S. dollar, at several points, was great enough to permit imports of major U.S. farm products such as wheat, soybeans, soybean oil, oats, and pork into the U.S. despite sizable import duties. A strong U.S. dollar encouraged foreign nations to invest in order to expand their agricultural production, and also enabled them to market those supplies more easily than would be possible with a weak dollar. While the dollar has dropped sharply in value against several industrial nation currencies since 1985, it remains quite strong relative to currencies of several other grain exporters and developing nation importers. Also, investments made when the dollar was stronger have few alternative uses and will continue to be used for agricultural production even in times of low farm product prices.

A third factor making U.S. agriculture extremely vulnerable to declines in export demand is its large excess production capacity. In the absence of government supply control programs, domestic demand would absorb only about two-fifths of the normal U.S. wheat production, one-half of the U.S. soybean crop, and two-thirds of the annual U.S. corn production. A healthy and growing export demand thus is vitally important to U.S. agriculture in utilizing its excess production capacity. Other sectors with a major stake in strong export markets include rural communities across the U.S. and workers and firms in the agricultural input, marketing, finance, and transportation sectors. With the increased physical volume of U.S. agricultural exports, financial conditions in these sectors are improving but remain much less favorable than in the decade of the 1970s. Negative impacts on U.S. production agriculture from the sharp decline in exports in the 1981-86 period were tempered by aggressive government land-idling programs, and sharply increased direct income payments to U.S. farmers to compensate for land being removed from production. However, agricultural input and marketing industries found demand for their products and services declining until mid-1987 as a result of the land-idling programs. Large-scale land-idling programs also have had negative impacts on rural communities by reducing local employment opportunities and demand for products and services of mainstreet businesses. A major uncertainty in future financial prospects for U.S. agriculture is the fact that sharply increased U.S. government costs for farm programs have generated pressure to reduce these expenditures in the next few years.

With the internationalization of agriculture, trade policies and trends are vitally important to the U.S. agricultural sector. With its heavy dependence on exports, realistic domestic policies for U.S. agriculture cannot be formulated without a recognition of their linkages to the export sector and the current export environment. Because of the important role of exports in the financial health of U.S. and world agriculture, there is a strong need for the U.S. and its trading partners to search for policies that will encourage increased agricultural trade.

Exchange Rate Problems Continue

There is considerable evidence that U.S. agricultural exports and imports respond to changes in the exchange rate of the dollar relative to other currencies, although time lags are involved. For example, a U.S. Department of Agriculture analysis indicated $3 billion of the decline in U.S. farm product exports during 1981-82 could be attributed to strength of the dollar relative to foreign currencies. Almost 10 million metric tons (400 million bushels) of the decline were assigned to corn exports alone. The authors also indicated that a 20 percent trade-weighted, inflation-adjusted rise in the dollar over a two-year period would decrease combined U.S. exports of corn, wheat, and soybeans by 16 percent from levels that would otherwise exist, provided that other market influences remained unchanged.[75]

Responses to weakness in the dollar's exchange rate the last three years may involve longer lags, particularly since they followed an extended period of relatively high prices and a relatively strong U.S. dollar. Strong grain and oilseed prices during the 1970s and the strong U.S. dollar in the early 1980s encouraged large investments in agriculture and farm input industries in many parts of the world. Investments included machinery, fertilizer and chemical production capacity, land clearing, drainage, irrigation, development of improved varieties, and related production-increasing activities. Since these investments have been made, they will continue to be used in production for an extended period of time, even with the recent low levels of dollar-denominated world grain prices.

Because of long-term exchange rate effects, it appears important for the U.S. and other industrial nations to give high priority to policy changes that will promote a reasonably stable and realistic exchange rate of the U.S. dollar. Instability of the U.S. dollar, to a considerable extent, appears to have its roots in U.S. monetary and fiscal policy, including the large U.S. budget deficit and its resulting decrease in funds available for private U.S. borrowing and investment, and increased need for foreign capital in-flows.[76] The deficit has been financed, in part, by an inflow of foreign capital to earn high U.S. real (inflation-adjusted) interest rates. The exchange rate of the dollar in this situation becomes subject to potential large fluctuations in international capital flows as foreign investor's perceptions about stability and growth prospects for the U.S. economy change. International capital flows also tend to drain investment funds from other nations, thus reducing foreign economic growth rates and retarding growth of export demand in some traditionally large U.S. agricultural export markets such as Western Europe. High U.S. real interest rates stem from a restrictive U.S. monetary policy that has been used to offset inflationary pressures from deficit spending. While U.S. interest rates declined significantly from 1986 to early 1987, the U.S. inflation rate also has remained well below the levels of the 1970s, leaving U.S. real interest rates at historically high levels. In mid-1988, the U.S. still had relatively high real interest rates when compared with those of Japan and some West European nations. If confidence in the U.S. dollar is weakened by other developments, still higher U.S. interest rates may be required to ration available loanable funds and attract foreign investment into the U.S.

More liberal growth of the nation's money supply to finance the budget deficit almost certainly would increase U.S. and world inflationary pressures, with the accompanying dangers of a new round of inflation-induced U.S. private and developing-nation debt buildup, and more serious adjustment problems in the future. Liberal growth of the U.S. money supply also would be likely to weaken the U.S. dollar, thus making it more difficult for the rest of the world to export to the U.S. and, in some cases, worsening debt-repayment problems of developing nations. In addition, with U.S. interest rates largely deregulated, renewed inflation likely would increase interest rates, and the resulting interest cost on the outstanding U.S. government debt of approximately $2.5 trillion would increase U.S. annual budget deficits. Thus, it is doubtful that the U.S. budget deficit problem could be solved by rapid growth in the nation's money supply. An attempt to solve it in that manner would carry large risks of more serious adjustment problems in the future.

As an indication of the changing U.S. budget situation, the annual federal budget deficit in 1979 was approximately $28 billion. With a sharp reduction in U.S. federal income tax rates and continued high government spending, it reached $221 billion by fiscal 1986, declined to $150 billion in fiscal 1987, and is expected to be in the $130 to $160 billion range in fiscal 1988.

With growing concern that the U.S. budget deficit would continue at or near a $200 billion annual rate for the foreseeable future, the U.S. Congress in late 1985 passed the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Reduction Act. This act provides for a series of increasingly large annual reductions in expenditures in most categories of the U.S. budget (including defense programs), except for social programs and long-term agricultural land-idling programs. Its goal is to balance the U.S. budget as the decade of the 1980s comes to a close. If this act is implemented fully and continually in the next few years, it may well permit a further decline in real U.S. interest rates and could help to stabilize or slightly strengthen the exchange rate of the U.S. dollar against developing nations' and other grain exporters' currencies. If so, that would be one of several factors helping to maintain a more stable and gradual uptrend in U.S. agricultural exports in the next few years.

Side benefits from dealing with the U.S. budget deficit would likely include a decline in interest-related cost pressures on U.S. agriculture, and somewhat increased U.S. private investment to stimulate the nation's economy and improve its productivity. Lower real interest rates also would have positive effects on trade by easing interest cost burdens of developing nations and tending to accelerate their economic growth rates. Dealing with exchange rates through monetary policy alone runs the risk of sharp and disruptive fluctuations in the value of the U.S. dollar. However, a more balanced fiscal and monetary policy approach would appear less likely to cause such reactions. With the far-reaching exchange rate impacts outlined here, U.S. general economic policy developments may be nearly as important to the future of U.S. agriculture as changes in farm price support programs.

Trade Subsidies[77]

Trade subsidies can take several different forms, including direct payments to producers and/or processors, price or commodity rebates to foreign buyers, subsidized financing terms, or outright donations of products or services to foreign importers. Such subsidies typically are used to increase an exporting nation's share of global trade and/or reduce surplus domestic supplies while protecting incomes of its agricultural producers. The U.S., as well as many other nations, use such subsidies. During the past two decades, trade negotiations between the U.S. and trading partners have been aimed at reducing export subsidies as well as other restraints to foreign trade. However, in the last two and one-half years, export subsidies by the U.S. and the EC have increased sharply as each has attempted to protect its agriculture from adverse developments in the world economy, and to increase its respective share of world food trade. Current U.S. examples of such subsidies include deficiency payments to grain producers under the U.S. target price system (these payments also are a compensation to producers for idling a sizable part of their cropland base), PL-480 export programs, the Export Enhancement Program, and exports of by-product feed ingredients from the corn milling industry, which are influenced by highway tax exemptions on alcohol fuels.

U.S. trade policy in 1987-88 was directed at the increasingly large grain export subsidies used by the EC to export its surplus agricultural production. The U.S. share of global exports of several major agricultural commodities declined sharply from 1981 to 1986; in some cases, the EC share of those same commodity exports increased. As a reaction to its declining trade shares, the U.S. in mid-1985 implemented the Export Enhancement Program, which was initially targeted against the EC's subsidized wheat exports. The program was sharply expanded in 1986-87 and 1987-88, and was broadened to also include exports of barley, vegetable oils, and sorghum. The program provides bonus quantities of commodities from U.S. government-owned grain or other farm product inventories when designated importers purchase commercial U.S. supplies. Its purpose is to make U.S. agricultural exports competitive with subsidized EC exports. Through mid-1988, this program had contributed strongly to increased U.S. wheat and barley export shares, even though it had been met by increased EC export subsidies. Recipient nations and areas under the program included the Middle East, North Africa, Eastern Europe, the USSR, and China. Current U.S. agricultural legislation mandates that U.S. export subsidies will be maintained at high levels for at least the next year.

A major caution should be raised in the use of such trade subsidies. Escalating U.S. and EC subsidies have led to a trade war, with each side progressively increasing its subsidies and/or lowering its prices to increase its respective trade share, and with each side incurring progressively larger costs. The trade war also has been pushed into nonagricultural products, with the U.S. placing large import duties on certain industrial products from Canada and Japan, and with the EC, at times, also threatening to protect its economy from such imports.

Large export subsidies of the U.S. and other certain major exporters may also have a strong negative impact on the agriculture of grain-importing developing nations. Such subsidies may depress prices in importing nations, thus weakening or removing the incentive for farmers in developing countries to expand production. In the long run, that could work to the disadvantage of consumers in lower income developing countries by limiting their nation's ability to become self-sufficient in food production. With these potential disadvantages, it is advisable to use trade subsidies with considerable caution. Such tools should not be expected to solve food trade problems arising from excessive indebtedness, slow global economic growth, overvalued currencies, and excess resources in the agricultural sectors of grain exporting nations.

Biotechnology: Implications for Future World Agricultural Trade[78]

Recent scientific developments have made possible the transfer of genes and other facilitating processes in plant and animal breeding that may sharply increase future agricultural productivity. Since biotechnology is in its infancy, its full potential impacts will not be known for at least one or two decades, and perhaps longer. Biotechnology encompasses a broad area including the development of plant and animal growth stimulants, biological control agents (for insects, weeds, diseases, etc.), improved plant and animal breeding techniques including transfer of favorable genes from one plant or animal to another, new processing techniques, and development of new crops and agricultural products.

Two recent developments in biotechnology that may have commercial application in the early 1990s are: (1) a naturally occurring hormone for cattle (bovine somatotropin or bST) that increases milk production per cow by 10 to 20 percent from levels occurring under current production programs; and (2) a growth stimulant for swine (porcine somatotropin) that may increase feed conversion efficiency by up to one-fifth or more from levels typical in current feeding programs, and also reduces the fat content of the meat. These two developments alone could have far reaching effects on U.S. and world agriculture if they are widely adopted.

Livestock Biotechnology

The milk production hormone would tend to sharply reduce the number of dairy cows (and dairy farmers) needed to meet market demand, would spread fixed costs in dairy production over more units of milk output, and might significantly lower total production costs per unit. The swine growth stimulant could sharply reduce grain requirements in the U.S. and world pork industries. Since the swine industry is one of the largest users of coarse grains, that would tend to increase surplus grain production while reducing grain import needs of major importing nations. The net effect could be a modest reduction in global grain trade at some time in the future.

Another currently available technology is the ability to transplant fertilized eggs in livestock breeding. Through this technique, offspring of genetically superior animals can be expanded in number much more rapidly than in the past. That process assists livestock breeders in developing animals with superior feed conversion efficiency, rates of gain, tendencies toward multiple births, desirable carcass qualities, and other beneficial features. During the next decade or two, this process may also contribute to improved production efficiency in animal agriculture and reduced grain requirements per unit of meat output. The ability to transfer genes through biotechnology may also facilitate this process and accelerate the improvement in productivity of the livestock sector. It thus may also be a restraint on future growth rates in global grain trade.

Crop Biotechnology

An area where potential productivity gains remain largely unknown is in the application of biotechnology to crop production. Potential future developments in this area might include breeding of grains, oilseeds, and other crops with greater tolerances to drought; transplanting nitrogen fixation ability from legumes to grains; development of commercially applicable hybrid soybeans; development of grains with greater resistance to cold, frost damage, insects, and lodging; and development of crops with naturally occurring herbicide and insecticide qualities. In some cases, these developments might substantially increase productivity per hectare, reduce total costs per unit, and somewhat reduce the sensitivity of crop production to adverse weather. If these developments materialize, they also would tend to increase surplus global grain availability and would create a challenge for policy makers in developing incentives to increase the availability of food for undernourished persons in developing nations, and in minimizing pressures for predatory trade practices by grain exporters seeking a larger share of a slowly growing world market. Major biotechnology developments in grain may be several years in the future, although there are indications of progress in the development of varieties resistant to certain insects and with certain herbicide tolerance characteristics.

Possible biotechnology developments reducing the need for herbicides and insecticides might help to deal with growing concern in Europe and the U.S. about water pollution stemming from heavy use of agricultural chemicals in crop production. These developments also could lower per unit costs of crop production, thus tending to enlarge the world market for grains and oilseeds by making livestock-poultry-dairy diets more affordable to the developing world. If successful, such developments would create major growth opportunities in the plant breeding and seed industries, but likely would create a need for major additional restructuring and disinvestment in agricultural chemical and possibly in the nitrogen fertilizer industry.

Development of New Uses for Farm Products

Biotechnolgoy also may offer future possibilities for expanded industrial use of agricultural crops, although such developments are largely speculative at this time. In the last two decades, developments in biochemistry, chemical engineering, and grain processing have led to the creation of new corn sweeteners and alcohol fuel industries, and new uses of corn starch in industrial applications. While a negative impact on U.S. and world sugar demand has resulted from these developments, the demand for corn has been increased modestly. Recent research also has made it technically feasible to use vegetable oils as a dust suppressant in grain elevators and for other industrial and agribusiness uses. As another example, recent research by the Agricultural Research Service of the U.S. Department of Agriculture has resulted in the development of a biodegradable plastic made from corn starch. The economics of commercial production are not yet clear, but it could result in additional demand for U.S. corn in the years ahead.[79] Future research conceivably could create additional new uses for grain and oilseed crops as raw materials in industrial processes, and at some future time might make possible the development of entirely new crops to meet specific industrial needs. As one example of this, limited research currently is being conducted on possible industrial applications of new oilseeds not currently grown on a commercial scale. As with crop and livestock biotechnology research, it will be important to monitor new developments in this area. Creation of large new blocks of demand for farm products through research in processing and biochemistry is not anticipated in the near future, although important new developments could occur in the early part of the twenty-first century.

Because of the relative newness of biotechnology research in crop production, its potential impacts are largely speculative at this time. However, this is an area of research that agricultural policy makers and managers of farm input, production, and marketing firms will need to monitor closely in the years immediately ahead. Major scientific developments in this area could have profound impacts on global food trade, the structure of production agriculture, appropriate domestic and world trade policies, agribusiness firms, the competitiveness of U.S. agriculture in world markets, food security, and the ability of the world to meet the needs of people in developing nations whose diets are below minimum nutritional standards. Present indications are that biotechnology in crop production will not have major impacts on world agriculture before the turn of the century, although significant impacts in livestock production may well occur during the next 5 to 10 years and may impact on grain utilization and trade.

Other Trade Policy Developments and Issues

Managing Developing-Nation Debts

Third world debt problems are interrelated with factors causing the strong U.S. dollar relative to many developing-nation currencies. Global policies for dealing with the exchange rate problem and high real U.S. interest rates thus may provide partial relief to heavily indebted nations. However, lower real interest rates alone will not completely resolve debt burdens. Many developing-nation loans are very short-term in nature. Increasing their repayment period will continue to be an important tool in helping such countries through current financial difficulties.[80] Other potentially important tools include more restrained monetary and fiscal policies in developing nations, policy measures designed to improve productivity of the economies involved, and lender exchanging of debt for equity in the developing-nation industries. While the task is difficult and will require caution, moderation, and a few more years of adjustment, the outcome is critically important for the world economy. Widespread inability of developing countries to meet debt repayment commitments could endanger multinational lending institutions, risk serious disruption of the world monetary system, and slow world economic growth or set the stage for a worldwide economic recession. Resolution of these problems will be important for agricultural exporting nations, as well as for the physical well-being of people living in developing countries. These nations as a group were one of the fastest growing import markets for farm products during the 1970s. With a shift to policies promoting economic stability and growth in the third world, they may offer significant growth in global demand for farm products in the years ahead.

Trade Protectionism

In today's world economy, there are strong pressures for increased protection of domestic industries against foreign imports. For example, the EC has threatened to place limitations on its imports of corn gluten feed and meal, oilseeds, and other U.S. farm products. In the United States, Congress has passed (although it was vetoed by the President) extensive trade legislation requiring retaliation against imports from nations that run consistently large trade deficits with the U.S. Other evidences of protectionism include voluntary restraints on Japanese exports of automobiles into the United States, which have been in effect the last few years. The U.S. also has restricted imports of Canadian hogs, imposed a tariff on imports of Canadian cedar shingles, threatened to take action against imports from Brazil unless that nation liberalizes policies relating to imports of U.S. products, and has strongly warned the EC against tightening its import restrictions.

These are only a few examples of a large list of recent and/or proposed protectionist trade policies. A Washington University study indicates such restrictions cost U.S. consumers about $58.5 billion annually in the form of hidden taxes, along with additional long-run costs through reduced incentives for innovation and improved productivity.[81] With unemployment problems, strong foreign competition, and domestic political pressures, most other major trading nations also are facing strongly increased pressure to protect domestic industries through trade restrictions. However, the lessons of the 1930s should be a reminder that protectionism leads to declining trade and sluggish world economic activity.[82] Protectionist trade policies of that period were a contributor to the world economic depression of the 1930s and are an important case example of the dangers of increased trade protectionism. In setting trade policy, it should also be recognized that trade requires two-way exchange between nations. One nation's exports generate revenue that is used to purchase its trading partner's products. The U.S. agricultural sector and the U.S. economy thus have a very important stake in resisting current tendencies toward increased trade protectionism.

Food Security

Food security is a critical and complex policy issue for much of the developing world. One aspect of the problem is illustrated by estimates that the caloric intake of more than 800 million people, or 60 percent of the population of less developed nations, is below the standards established by the United Nations Food and Agriculture Organization and the World Health Organization.[83] Furthermore, these estimates do not reflect quality dimensions of diets such as protein levels and other nutritional requirements. The hunger problem is concentrated in Sub-Saharan Africa, as well as parts of Latin America and South Asia. While food production has increased in some parts of Africa, serious long-term problems and challenges in food production remain, along with current food shortages in some African nations.

Another view of current world food security is illustrated by food security standards for grain carryover stocks. Some world food authorities place minimum stock levels for food security purposes at 17 to 18 percent of global annual utilization. Global carryover stocks in 1988 are estimated at 24 percent of annual utilization, modestly above the minimum standard.[84] However, this standard is only a general guideline. The geographic distribution of stocks is important from a food security standpoint and also can have a considerable effect on prices paid to producers in exporting countries if stocks are concentrated in a few major exporting regions, as is currently the case.

Short-run dimensions of food security include the ability to meet emergency food needs resulting from drought or other natural disasters. Difficult issues yet to be resolved here include the desired size and locations of reserve stocks, methods of sharing storage costs, and methods of acquiring and releasing stocks to minimize disruptions in importer and exporter nations. These issues are especially important for the people of Sub-Saharan Africa, the Indian subcontinent, and parts of Latin America where food shortages have been a frequent occurrence.[85]

Long-run dimensions of food security include policies for increasing food production in food-deficit developing nations, improved distribution systems, and population trends. Uneven distribution of food reflects severe poverty in many areas. Poverty, lack of financing for food purchases, and physical distribution problems are major elements in the current world food problem. Global food production is sufficient to adequately meet the needs of the world's current population.[86] Dealing effectively with these problems is a major challenge for current and future generations. Its importance is highlighted by the fact that the third world has been the flashpoint for East-West conflicts.[87] For that reason, food security, poverty or economic well being, and world peace are closely interrelated.

Policies Related to Value-Added Exports

Value-added exports benefit the exporting nation by enabling its population to gain from employment in processing activities and an economic multiplier effect as expenditures in the processing sector are dispersed through its economy. Examples of policies encouraging exports of value-added products include the soybean industries in the EC and Brazil. As noted in an earlier section of this report, the U.S. share of global processed soybean product exports dropped substantially from 1979-80 through 1985-86 while these two areas enjoyed a sharply rising share. Because the U.S. soybean processing industry has excess capacity, this issue appears likely to receive additional attention in the next few years. Brazil encourages exports of processed products rather than soybeans by differential export taxes, with a larger tax on soybean exports than on exports of soybean products, as well as by export quotas on soybeans, subsidized interest rates for processors, and duty-free imports of equipment used in production of export goods.[88] In the EC, a modest import tax is applied to soybean oil, thus favoring imports of soybeans for processing, rather imports of meal and oil. The processing industries in these areas and the U.S. appear to be moving closer to a confrontation. Consequently, this issue may be one of many trade policy questions coming to the forefront in the late 1980s and early 1990s

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Appendix I. Classification of Countries by Economic Category

Appendix I. Classification of Countries by Economic Category.

Developed Market Economies

Australia
Austria
Canada
Denmark
Finland
West Germany
France
Iceland
Ireland
Italy
Japan
Luxembourg and Belgium
The Netherlands
Norway
Sweden
Switzerland
United Kingdom
United States

Centrally Planned Economies

Albania
Angola
Bhutan
Bulgaria
China
Cuba
Czechoslovakia
East Germany
Hungary
Kampuchea (Cambodia)
Korea (North)
Laos
Mongolia
Mozambique
Poland
Romania
South Yemen
USSR
Vietnam
Yugoslavia

Rapidly and Moderately Developing Nations

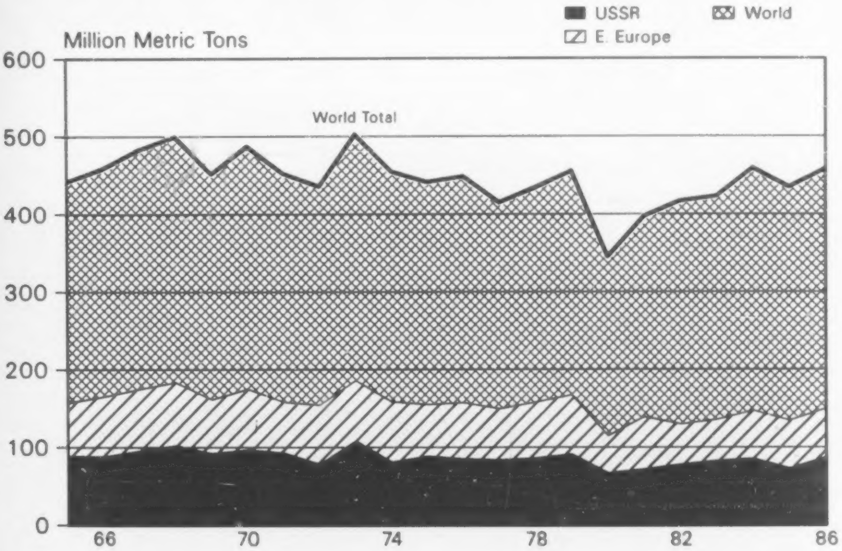
Algeria
Argentina
Bolivia
Brazil
Cameroon
Chile
Colombia
Congo
Costa Rica
Cyprus
Dominican Republic
Ecuador
Egypt
El Salvador
Ghana
Greece
Guatemala
Honduras
India
Indonesia
Iran
Iraq
Israel
Ivory Coast
Jamaica
Jordan
Korea (South)
Kuwait
Lebanon
Liberia
Libya
Malaysia
Mexico
Morocco
New Zealand
Nicaragua
Nigeria
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Portugal
Puerto Rico
Saudi Arabia
Senegal
Singapore
South Africa
Spain
Syria
Taiwan
Thailand
Trinidad
Tunisia
Turkey
Uruguay
Venezuela
North Yemen
Zambia
Zimbabwe

Other Developing Nations

Afghanistan
Bahamas
Bahrain
Bangladesh
Barbados
Benin
Botswana
Burma
Burundi
Canary Islands
Central African Republic
Chad
Comoros
Cape Verde
Dijibouti
Dominica
Ethopia
Equatorial Guinea
Fiji
French Pacific Islands
French West Indies
Gabon
The Gambia
Grenada
Guinea
Guinea Bissau
Guyana
Haiti
Hong Kong
Kenya
Lee Wind Islands
Lesotho
Madagascar
Malawi
Maldives
Mali
Malta
Mauritania
Mauritius
Nepal
Netherland Antilles
Niger
Oman
Other West African
Qatar
Rwanda
St. Lucia
Sao Tome Principe
Seychelles
Sierra Leone
Solomon
Somalia
South Pacific Islands
Southwest African
Sri Lanka
Sudan
Surinam
Swaziland
Tahiti
Tanzania
Togo
Uganda
United Arab Emirates
Upper Volta
Western Samoa
Zaire

Appendix II. Potato, Cassava, and Pulse Production by Major Producing Areas

Appendix II, Figure 1. World Potato Production by Millions of Metric Tons by Major Producing Areas, 1965-86 Calendar Years.



Source: Food and Agriculture Organization of the United Nations, *Production Yearbook* (Rome, Italy); various issues.

Appendix II, Table 1. Cassava Production in Major Producing Nations from 1973 through 1986 in Millions of Metric Tons.

Area or Country	1973	1979	1981	1984	1985	1986
China	2.0	2.5	3.5	3.9	3.7	3.6
India	6.4	6.1	5.9	5.9	5.6	6.0
Indonesia	11.2	13.8	13.3	14.2	14.0	13.3
Philippines	0.5	2.3	2.3	1.3	1.6	1.7
Thailand	5.7	11.1	17.7	20.0	19.2	15.2
Others	0.4	0.4	0.5	1.2	1.2	1.4
Far East Total[a]	26.1	36.1	43.2	46.5	45.3	41.2
Ghana	1.6	1.8	1.7	4.1	3.0	3.7
Mozambique	2.5	3.0	3.2	3.2	3.3	3.3
Nigeria	9.6	10.5	11.0	11.8	13.5	14.7
Tanzania	3.8	5.1	6.0	5.6	5.5	5.5
Zaire	11.0	12.0	13.2	15.0	15.5	15.6
Others	12.5	13.6	14.8	13.6	17.7	18.1
Africa Total[a]	41.0	46.0	49.8	53.3	58.5	60.9
Brazil	26.5	25.0	24.5	21.5	23.1	25.5
Colombia	2.0	1.9	2.2	1.4	1.4	1.3
Others	3.5	4.1	4.2	4.7	5.1	5.3
Latin America Total[a]	32.0	30.9	30.8	27.6	29.6	32.1
World Total[a]	101.3	117.6	128.0	131.0	137.0	137.0

Source: Food and Agriculture Organization (FAO) of the United Nations, *Food Outlook*, No. 8, 1986 (Rome, Italy), September 1986; and 1986 FAO *Production Yearbook*, Vol. 40.

[a] Totals may not add up due to rounding.

Appendix II, Table 2. World Pulse Production in Major Producing Areas from 1973 through 1986 in Millions of Metric Tons.

Area or Country	1973	1976	1978	1979	1980	1982	1983	1984	1985	1986
Asia	20.7	22.9	22.4	22.2	19.9	22.2	23.7	24.0	23.0	24.6
Africa	4.7	5.8	5.6	5.7	5.4	6.0	5.5	5.0	6.0	7.0
C. America	1.6	1.3	1.7	1.5	1.6	1.8	1.9	1.8	1.6	1.9
S. America	2.9	2.6	3.0	3.2	2.7	3.8	2.4	3.5	3.5	3.2
N. America	1.0	1.1	1.3	1.3	1.7	1.7	1.1	1.4	1.5	1.8
W. Europe	2.0	1.6	1.8	1.8	1.9	1.9	2.1	2.7	3.2	3.9
E. Europe	0.8	0.6	0.8	0.7	0.8	1.0	1.0	1.4	1.4	1.4
USSR	8.4	8.7	7.8	4.3	6.4	6.5	8.2	8.8	9.5	10.4
Oceania	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.6	1.1	1.1
World Total[a]	42.2	44.8	44.5	40.9	40.6	45.2	46.2	49.1	50.8	55.2

Sources: Food and Agriculture Organization (FAO) of the United Nations (Rome, Italy), *Food Outlook* 1983, Statistical Supplement, March 1984 and February 1987; and 1986 FAO *Production Yearbook*, Vol. 40.

[a] Totals may not add up due to rounding.

Appendix III. Major Destinations of U.S. Soybean Exports in 1975-76 and 1986-87

Appendix III, Table 1. Percentage Shares of U.S. Soybean Exports to Major Foreign Destinations in 1975-76 and 1986-87.

Region or Country	1975-76	1986-87
	Percentage	
Western Hemisphere	3.7	10.3
European Community	60.0	47.3
Other Western Europe	1.5	1.1
Eastern Europe	1.5	3.0
Israel	2.7	1.9
Japan	21.6	19.4
Taiwan	5.2	9.4
Others	3.8	7.6

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, various issues.

Appendix IV. Sources of U.S. Beef and Pork Imports in 1986-87

Appendix IV, Table 1. Percentage Shares of Dollar Value of U.S. Beef and Veal Imports from Major Foreign Origins in 1986-87.

	1986-87 Percentage
Canada	8.2
Central America	5.9
Brazil	3.4
Argentina	9.4
Australia	43.4
New Zealand	27.1
Others	2.6

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

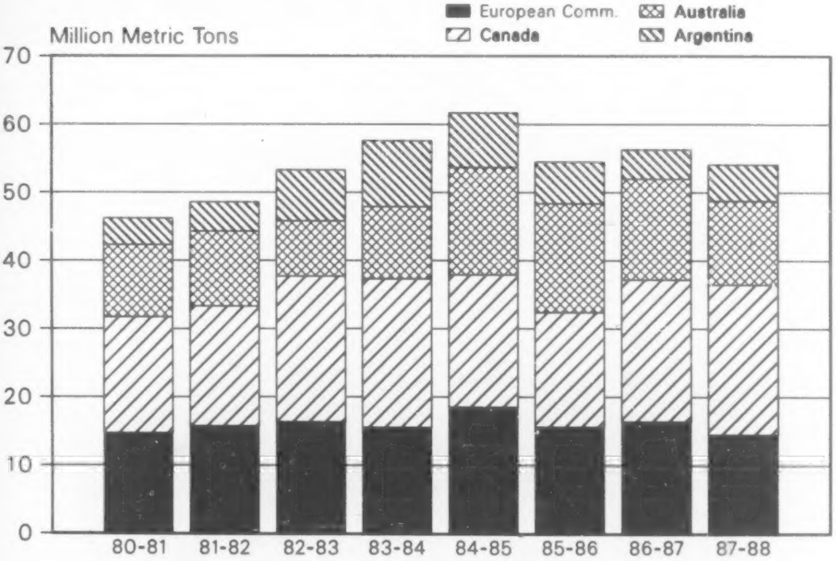
Appendix IV, Table 2. Percentage Shares of Dollar Value of U.S. Pork Imports from Major Foreign Origins in 1986-87.

	1986-87 Percentage
Canada	41.6
European Community	36.8
Eastern Europe	19.2
Others	2.4

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

Appendix V. Wheat and Coarse Grain Exports by Major Non-U.S. Exporters

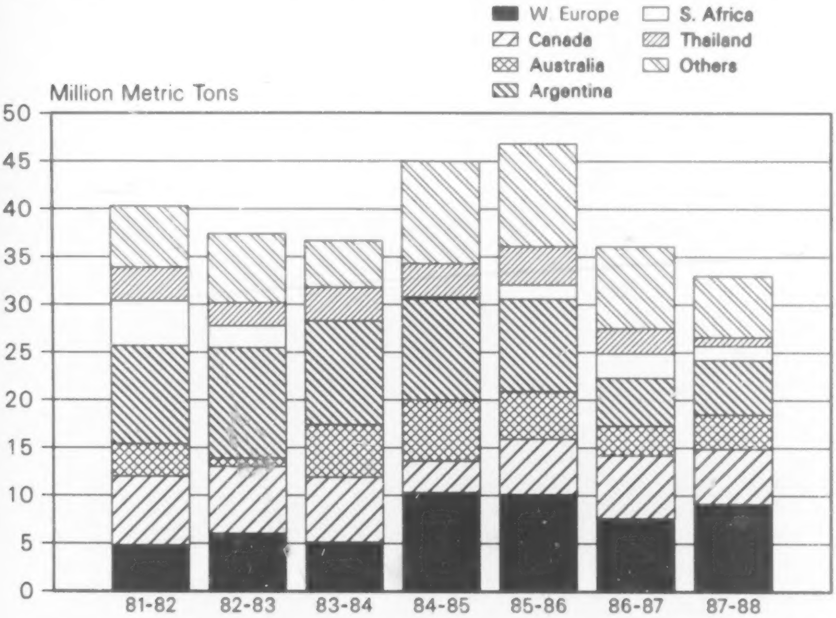
Appendix V, Figure 1. Wheat Exports by Major Non-U.S. Exporters, July-June 1987-88 and Comparisons with Recent Years in Millions of Metric Tons.[a]



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

[a] From 1982-83 on, the EC is EC-12.

Appendix V, Figure 2. Coarse Grain Exports by Major Non-U.S. Exporters, October-September 1987-88 and Comparisons with Recent Years in Millions of Metric Tons.



Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Grain Situation and Outlook*, FG 3-88, March 1988; various other issues.

Appendix VI. World Milk Production, 1968-1988, by Major Producing Regions

Appendix VI, Table 1. World Milk Production, 1968-1988, by Major Producing Areas in Millions of Metric Tons.

	Avg. 1968-72	1973	1976	1981	1982	1983	1984	1986	Prelim. 1987	Forecast 1988
U.S.	53.4	52.4	54.3	60.2	61.5	63.4	61.4	65.4	64.5	65.3
EC-12	94.0	97.8	97.9	104.9	108.2	118.2	116.2	115.8	110.7	107.2
USSR	82.6	88.3	91.8	88.9	91.0	96.5	97.9	102.1	103.2	104.9
Eastern Europe	31.7	34.7	35.7	40.2	39.6	42.1	43.7	42.7	42.8	42.4
India	21.7	23.1	23.7	14.0	14.9	16.0	17.1	19.5	17.7	18.5
Other Western Europe	21.6	22.1	22.3	22.5	22.8	16.3	16.6	16.1	15.9	15.8
Brazil	7.3	7.2	8.5	10.5	10.1	10.7	10.8	9.8	11.0	11.5
New Zealand	6.2	6.0	5.7	6.7	6.8	6.9	7.6	8.2	7.3	8.0
Australia	7.3	7.3	7.0	5.3	5.4	5.7	6.1	6.2	6.3	6.4
Canada	8.2	7.7	7.6	8.0	8.3	7.9	8.1	7.9	8.0	8.0
Total[a]	334.1	346.6	354.5	361.2	368.6	383.5	385.5	393.7	387.4	388.0

Sources: U.S. Department of Agriculture Circular, *Dairy, Livestock and Poultry*, FD 1-87, November 1987; FD 2-86, November 1986; FD 1-86, May 1986; FD 1-85, March 1985; FD 6-76, December 1976.

[a] Total may not add up due to rounding.

Appendix VII. Long-Term Trends in Wheat and Coarse Grain Production and Trade for Selected Regions and Nations

Appendix VII, Table 1. Long-Term Trend in Grain Production for Selected Regions and Nations in Millions of Metric Tons.[a]

	1895	1903	1913	1923	1933-34	1935-39	1955	1963	1973	1983	1984	1986	1987[h]
Australia	.83[b]	.50	2.89	3.72	4.77[c]	5.05	6.40	10.12	14.80	10.95	26.89	21.42	19.0
Argentina	3.46[d]	6.61[d]	10.19	14.03	14.82	14.20	11.54	14.52	10.02	24.21	21.67	21.63	23.2
Canada	2.66	3.94	7.79	14.93	8.85	10.62	22.95	25.41	36.58	47.21	42.73	43.54	52.3
Eastern Europe[e]	21.76	24.42	27.97	24.77	34.23	29.15	N/A	23.41[b]	68.88	87.54	83.31	86.48	101.9
India	6.95[c]	8.10[c]	12.98	15.23	14.17	10.81	13.44	17.76	32.92	46.04	52.59	53.57	68.6
Mexico	2.10[d]	2.79	2.36	3.16	2.32	2.19	4.04	8.29	2.02	11.62	12.91	14.82	21.0
China	N/A	N/A	N/A	N/A	N/A	14.21[f]	N/A	N/A	62.97	135.62	156.50	154.48	182.4
North Africa	3.20	4.20	4.90	6.92	6.85	7.38	9.30	9.83	10.20	12.97	11.24	15.24	56.3
South Africa[d]	N/A	N/A	.95	.98	1.96	2.47	4.13	5.20	12.97	6.50	6.20	10.17	11.4
Turkey[c]	1.84	1.66	1.44	N/A	2.71	3.69	8.01	7.89	8.00	13.80	13.30	12.70	29.0
USA	69.24	77.23	86.80	84.74	77.52	84.65	118.18	143.78	199.03	295.70	182.98	304.00	272.9
USSR	18.07	25.00	39.58	12.30	41.34	47.32	N/A	66.12	178.04	140.50	145.00	143.70	200.1
Brazil	N/A	N/A	N/A	3.99[g]	N/A	5.46[g]	6.98[g]	7.70[g]	16.93[d]	21.35[d]	23.10[d]	23.30[d]	33.9
Western Europe	28.22	34.75	36.42	35.59	44.69	41.60	51.98	74.80	115.73	145.26	140.28	160.39	183.6
World Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	848.25	1082.13	1005.39	1158.84	1330.7

Sources: U.S. Department of Agriculture, *Yearbook*, 1899, 1907, 1915, 1925, 1935; Sanford Evans Statistical Service, *Grain Trade Yearbook* (Winnipeg, Canada), 1954-55, 1957-58; U.S. Department of Agriculture, *Agricultural Statistics*, 1965, 1974, 1985, and Food and Agriculture Organization of the United Nations, *Food Outlook* (Rome, Italy), May 1988.

[a] Wheat, corn, and barley.

[b] Wheat and barley.

[c] Wheat.

[d] Wheat and corn.

[e] Eastern Europe up to 1913 includes Austria which used to be part of Austria-Hungary. Corn production for East Germany up to 1935-39 are estimated. Barley and wheat production for East Germany up to 1933 are estimated.

[f] Corn and barley.

[g] Corn.

[h] Wheat and coarse grains.

N/A—not available.

Appendix VII, Table 2. Long-Term Trend in Net Exports of Grains for Selected Regions and Nations in Millions of Metric Tons.[a]

	1903	1913	1923	1933-34	1934-38	1955	1963	1973	1983	1984	1986
USSR	4.81[d]	7.23[b]	-.10	1.61	.95	2.60	2.37	-17.22	-27.47	-38.75	-20.22[i]
China	N/A	.02[a]	-.59[e]	-2.20	-1.00	.03	-4.57	-6.49	-17.96	-12.66	-5.59[i]
Brazil	-.17[c]	-.44[c]	-.60[c]	-.91[c]	-.92[b]	-1.69[c]	-2.22[c]	-2.99[c]	-4.35[c]	-4.67[b]	-4.60[i]
Japan	-.08[c]	-.17[c]	-.40[b]	-.10[d]	-.46	-3.21	-6.01	-14.44	-21.70	-20.24	-21.63[i]
Egypt	-.00[f]	-.06[e]	-.03[e]	.01[e]	.00[e]	.00[f]	N/A	-.07[f]	-1.40[f]	-1.58[f]	-8.85
Mexico	-.01[f]	-.04[f]	-.09[f]	.00[f]	.03[e]	.05[e]	-.45[e]	-1.17[e]	4.60[e]	-2.58[e]	-1.94[i]
Australia	.03[c]	1.17[c]	1.40[b]	2.42[b]	2.11	2.01	5.07	6.44	16.66	13.74	20.59[i]
Argentina	3.79[d]	7.66	7.11	10.02	10.08	4.50	4.34	6.88	17.07	12.91	11.52[k]
Canada	.18[d]	3.61	7.48	5.27	4.23	6.48	11.45	15.32	28.09	25.58	22.58[i]
Eastern Europe[h]	.98[d]	1.80	.69	2.29	2.41	-3.33	-4.43	-4.82	-6.01	-3.51	-4.38[i]
India	1.32[c]	1.60[b]	.67[b]	.00[b]	.19[b]	-.44[c]	-4.08[c]	1.83[b]	-3.22[b]	-1.81[b]	-3.82[b]
USA	2.68[d]	2.99	8.32	.94	.09	9.88	32.32	73.41	90.04	94.37	54.04[i]
South Africa	N/A	-.15	-.03	.03[d]	.32[d]	.47[d]	2.20	1.66	.05	-2.48	1.36
Western Europe	-14.94[d]	-20.58	-21.71	-20.30	-18.97	-15.29	-19.25	-17.58	2.83	15.56	19.15[i]

Sources: U.S. Department of Agriculture, *Yearbook*, 1907, 1915, 1925, 1935; Food and Agriculture Organization of the United Nations, *FAO Trade Yearbook* (Rome, Italy), 1958, 1966, 1972, 1973, 1974, 1975, 1984, 1985, 1986.

[a] Wheat, corn, and barley.

[b] Wheat and barley.

[c] Wheat.

[d] Wheat and corn.

[e] Corn and barley.

[f] Corn.

[g] Barley.

[h] Eastern Europe up to 1913 includes Austria, which used to be part of Austria-Hungary. Corn and wheat trade for East Germany up to 1934-38 are estimated.

[i] Wheat, corn, barley, and oats.

[j] Wheat, corn, barley, rye, and oats.

[k] Wheat, corn, and oats.

N/A—not available.